

Mobile Phones for Health Education

*A Case Study of Text to Change's HIV and AIDS SMS Quiz Project
in Mbarara District, Western Uganda*

Bonny Apunyu



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Abstract

In environments where diseases such as HIV and AIDS are often taboo, successful awareness and educational interventions must address peoples' privacy and confidentiality concerns. The ubiquity and low cost of Text Message Services (SMS) hold the potential to effectively deliver HIV and AIDS awareness and education by communicating with people in an accessible and engaging manner that both respects their privacy and gives them the tools to make informed choices.

This study presents an evaluation of an incentive-based SMS quiz approach designed to improve awareness of HIV and AIDS in Mbarara District, Western Uganda. The goal of deploying HIV and AIDS related quizzes to the target population is to increase people's awareness and knowledge about the disease, to promote their healthy behaviour and to encourage them to know their health status and seek treatment if necessary.

This study employs the domestication of media and technology as a theoretical framework to understand how *Text to Change* deployed SMS quizzes to improve HIV and AIDS awareness in the selected area of study. Data was collected mainly through in-depth-interviews and observation. The study sought to provide an in-depth analysis of the project which could be linked to theoretical assumptions that explain how mobile-based technologies can be used in HIV and AIDS education and awareness. The paper thus did not aim at generalizing findings but sought to provide illumination, understanding and extrapolation of the findings to similar situations.

This qualitative study suggests that text messaging may be a very useful and culturally-relevant platform to support HIV and AIDS education today. In developing countries like Uganda, text messaging have proven effective in targeting hard-to-reach populations especially those in rural areas where the absence of clinics, lack of healthcare workers and limited access to health-related information often prevent people from making informed decisions about their health. While other communication media such as radio, television, voice-based information hotlines and interactive websites can be employed in the service of education about HIV and AIDS issues, SMS stands out as having several advantages over each of these: cost-effectiveness, scalability, convenience, broad reach and widespread popularity in low-income countries.

This study however notes that text messaging has a huge disadvantage of being only able to allow only 160 characters. Secondly, most keypads do not support local languages such that, the SMS service requires users to type and read responses only in English hence may be a constraint to the target users. Additionally, poor quality of mobile phone services sometimes makes their use frustrating. On occasions, the service providers may offer no service at all, or very poor reception for days. Additionally, text messaging has become more popular among younger generations compared to other groups, a factor that may limit its scope and scalability. Another a potential drawback to the use of text message-based educational interventions is the marginalization of certain populations such as those that are illiterate or do not have access to mobile phones. However, some of these limitations may be reduced as mobile technology advances. For example, innovations exist that provide voice response systems and images instead of text for those with limited literacy.

This study established that there were no clear differences between intervention outcomes delivered by the SMS quiz and the existing HIV and AIDS awareness mechanisms. Moreover, the respondents still preferred the traditional channels of communication to access HIV and AIDS related information. In light of this, organizers of the SMS quiz note that in addition to providing the HIV and AIDS information to the target audience in a relatively cheaper, convenient, private and interactive manner, another issue to explore is whether target populations are prompted to take action such as to seek voluntary counseling and testing upon receiving the quizzes.

This study suggests that text messaging should not be considered a stand-alone model for delivering HIV and AIDS education but rather as a tool by which several awareness techniques can be administered. Further, if text message intervention studies are built on evidence and theory, the potential impact of these interventions may yield better outcomes.

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List of Abbreviations

AIC	AIDS Information Centre
AIDS	Acquired Immune Deficiency Syndrome
GPS	Global Positioning System
GSM	Global System for Mobile
HCT	HIV Counseling and Testing
HIPS	Health Initiatives for the Private Sector
HIV	Human immunodeficiency virus
ICT	Information Communication and Technology
ICT4D	Information Communication and Technology for Development
ITU	International Telecommunication Union
MHealth	Mobile Health
MTN	Mobile Telecommunication Company
NGO	Non-Governmental Organization
PDAs	Personal Data Accessories
PEPFAR	President Bush's Emergency Plan for AIDS Relief
SMS	Short Messages
STI	Sexually Transmitted Infections
TTC	Text to Change
UCC	Uganda Communications Commission
UNAIDS	Joint United Nations Programme on HIV and AIDS
UNICEF	United Nations Children's Education Fund
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

Table of Contents

Abstract.....	III
Acknowledgment	VII
List of Abbreviations.....	IX
1 Introduction	1
1.1 Background	1
1.2 The problem.....	2
1.2.1 HIV and AIDS in Africa/Uganda.....	2
1.2.2 HIV and AIDS knowledge gaps in Uganda	3
1.3 The Case Study.....	5
1.3.1 Text to Change (TTC)	5
1.3.2 The process	5
1.3.3 The pilot project.....	5
1.4 Research objectives.....	6
1.5 Research questions.....	6
1.6 Significance of the study	7
1.7 Structure of the study.....	7
2 Literature review	9
2.1 Introduction	9
2.2 Mobile communications in Uganda.....	9
2.3 Use of ICT for health care in Africa.....	13
2.4 Contribution of mobile phones to health in developing countries	13
2.5 The limits of mobile telephony and missed opportunities in Africa.....	15
2.6 mHealth.....	16
2.7 Text-based health initiatives	18
2.7.1 Text Messaging Services (SMS).....	19
3 Theoretical Framework	21
3.1 Introduction	21
3.1.1 Theoretical review	21
3.1.2 Domestication, a brief history of the concept	21
3.1.3 The concept	22
3.1.4 The Domestication model	23

3.1.5	Outline of the model	23
3.1.6	Dimensions of Domestication	24
3.1.7	Key theoretical assumptions	25
3.2	Domestication and mobile phones.....	26
3.3	Taking Domestication outside the home.....	29
3.4	Mobile phones in society	29
4	Methodology	31
4.1	Introduction	31
4.2	Choosing a qualitative method	31
4.3	Triangulation as a technique.....	33
4.4	The Case Study approach.....	33
4.5	Methods and procedures.....	35
4.5.1	Qualitative Interviews.....	35
4.5.2	Focus Group Discussions.....	37
4.5.3	Observation.....	38
4.6	Data analysis	40
4.7	Data credibility	40
4.8	Limitation of the study.....	41
4.9	Chapter summary.....	42
5	Research findings	43
5.1	Introduction	43
5.2	The Case Study: The HIV and AIDS SMS quiz program	43
5.2.1	The program stakeholders	44
5.2.2	The SMS quiz	45
5.2.3	Implementation	47
5.2.4	Outcome	48
5.3	Perceptions on use of SMS quiz for HIV and AIDS education	49
5.4	Chapter summary.....	58
6	Concluding discussion and recommendations	59
6.1	Introduction	59
6.2	Summary.....	65
6.3	Challenges to HIV and AIDS education in Uganda	68

6.4	Implications for research	69
6.5	Implications for practice	70
6.6	Implications for theory	71
6.7	Recommendations	72
References		75
Annexes		83
	Annex 1: The SMS-based quiz	83
	Annex 2: Guide for interviews with TTC Staff and project partners	86
	Annex 3: KAP survey questions for focus groups.....	87
	Annex 4: Guide for interviews with technical respondents and peer educators	89
	Annex 5: Map of Uganda showing Mbarara District	91

1 Introduction

1.1 Background

Rapidly emerging mobile communications platforms such as mobile phones in many countries worldwide offer new opportunities for delivering health care services by placing timely information into the hands of those who need it most. The capability, referred to as “mobile health” or more commonly as “m-health,” involves innovative use of mobile devices to link remote persons directly with the healthcare system to exchange information and provide education and other services.

There are approximately four billion cellular subscribers in the world, with the most rapid growth in use of mobile phones occurring in the developing countries¹. Global mobile penetration grew 10-fold in the last 10 years and is likely to approximate 100% by 2018.² The remarkable penetration of mobile phones in Africa has set the stage for tremendous innovation in mobile applications and services. The number of mobile phone users in Africa grew from 49 million in 2002 to 280 million in 2007 and it is projected to approach 600 million by 2012³. This widespread adoption combined with the relative absence of wired network infrastructure and computers means that many Africans’ first contact with a networked computing device is the mobile phone.

Such a rapid growth in mobile phone networks has been made possible by the proliferation of GSM (Global System for Mobile communications)—the standard for mobile communications across the world. According to the GSM Association, GSM networks currently cover 219 countries and territories, serving more than 3 billion people. All mobile phones today offer voice and data communication.

¹ International Telecommunication Union report available at: <http://www.itu.int/ITU-D/ict/publications/world/world.html> (last accessed October 18, 2010).

² Sharma C. Mobile services evolution 2008–2018. Available at: www.chetansharma.com/UNF%20-%20Mobile%20Services%20Evolution%20Final.pdf (last accessed October 18, 2010).

³ Blycroft Limited. African Mobile Fact book 2008: Available at: http://www.w3.org/2008/MW4D/wiki/FrontPage?action=AttachFile&do=get&target=Africa_Mobile_Fact_Book_2008.pdf (Last accessed October 18, 2010)

The most commonly used data application is the short message service (SMS), also called person-to-person “text messaging.” More advanced mobile phones called smart phones often have additional features, including Internet e-mail and browsing; built-in camera; speakerphone; voice recorder; GPS receiver; Bluetooth and Wi-Fi connectivity; and the capacity to download, view, and store music, videos, or games and operate a variety of software applications (Apps). Some phones also include a touch screen or keyboard and other accessories. While the advanced computer-like smart phones offer more capabilities, their availability, affordability, and sustainability remain issues.

The majority of m-health activity is occurring in the developing world through basic voice and SMS functionality over GSM networks. A range of mobile health applications is being implemented and tested by innovative public–private partnerships to showcase the promise of m-health across a variety of applications and settings. Cellular technology is being used to deliver medication and appointment reminders; provide health education and launch awareness campaigns; facilitate remote data collection and remote monitoring; and enable tracking, diagnostics, and treatment support in case of disease and epidemic outbreaks.

“The explosive spread of mobile phone networks across the developing world has created a unique opportunity to significantly transform how countries can tackle global health challenges,” said Dr. Howard Zucker, Assistant Director-General of the World Health Organization (WHO), representing the WHO at the Phones for Health partnership’s launch at the 3GSM World Congress in Barcelona in 2007.

1.2 The problem

1.2.1 HIV and AIDS in Africa/Uganda

Sub-Saharan Africa is the region most heavily affected by HIV in the world, accounting for 67% of infection and 72% death worldwide (UNAIDS, 2009). The HIV and AIDS prevalence rate for both adults and children in sub-Saharan Africa was approximately 22.4 million in 2008, 1.9 million of which were newly infected (UNAIDS, 2009). The estimated number of AIDS-related death in the region was 1.4 million in the same year (Avert, 2010; UNAIDS, 2009). In Uganda alone, approximately 1 million people live with HIV and AIDS as of 2008, with slightly more females than males (Avert, 2010).

Although the number of AIDS related deaths in Uganda has decreased drastically from 120,000 in 2001 to 70,000 in 2007 (Avert, 2010; UNStats, 2010), trends are reported to be reversed in the rural areas. Guwatudde et al. (2009) highlighted the high potential for a rise in the HIV infection rates in rural Uganda, and reported an HIV prevalence rate of 9.9%, as compared to the national average of 6.4%. In fact, the rural population accounts for close to 90% of the current statistics. Recent statistics showed that women accounted for 7.5% of the figures and men accounted for 5% (Uganda Bureau of Statistics and Macro International Inc. 2007).

In addition, there seems to be a discrepancy between governmental efforts and its impact on the population. Stigma towards HIV and AIDS victims has been identified as one of the major barriers to addressing the issue in Africa as well as the rest of the world (Gilbert & Walker, 2009; Maughan-Brown, 2010; Sambisa, Curtis, & Mishra, 2010; Maman et al., 2009). In a recent nationwide survey of Zimbabweans on HIV testing, Sambisa et al. (2010) found that even though mass media promotion efforts positively correlated to testing, stigmatization posed a strong obstacle. In particular, women who fear social rejection were the least likely to get tested. However, individuals who know people with HIV and AIDS and observed discrimination against others regardless of whether they know people with HIV and AIDS led to higher uptake of the test. Findings suggest that the stigma associated with the issue could work both ways in influencing testing behaviour.

1.2.2 HIV and AIDS knowledge gaps in Uganda

The sharp increase in penetration rates of HIV and AIDS in Uganda is attributed to low levels of awareness about the disease and prevention methods. It is likely that women are more vulnerable to the disease due to lower levels of knowledge as compared to men. The Uganda Bureau of Statistics and Macro International Inc. (2007) found that while 42% of Ugandan men had comprehensive knowledge on HIV and AIDS, only 31% of the women were equipped with such knowledge. Women in Uganda are at an educational disadvantage compared to men. Women's comparative lack of schooling limits their opportunities and constrains their choices. Education is crucial to gaining the knowledge; skills and confidence that women need to improve their status and health. Studies show that a woman's educational level is strongly associated with health status, contraceptive use, fertility rates, and health of her children.

Although the Ugandan Ministry of Health launched a door-to-door HIV screening program as well as a voluntary counseling and testing clinic, an estimated 80% of Ugandan youths and adults

still remain unaware of their HIV status today. According to Tumushabe (2006), HIV and AIDS awareness campaigns have been carried out in Uganda since the mid-1990s, after the liberalization of the mass media. Radio was the main platform utilized for education on the issue at the period of time when HIV and AIDS patients were highly discriminated against. The print media, in particular a newsletter focusing on frank information about sex and relationships, was used to reach out to schools and community groups. In addition, the government also carried out related campaigns and distributed condoms as part of their efforts. However such health messages in the area reduced significantly after 1995 as the government shifted their attention to other issues. In the mid-2000s, other awareness and prevention efforts were implemented by international organizations such as the International HIV and AIDS Alliance, which offered related health services, provided information about the disease, and distributed condoms to the community⁴.

Despite attempts to educate Ugandans about the issue, HIV and AIDS prevalence rates remained high especially for rural areas (Tumushabe, 2006). This is most likely due to the fact that access to health facilities in these areas is lower than that within urban regions. It also suggests that the mass media campaigns failed to have an impact on the rural population, as evidence from the higher HIV and AIDS incidence. In addition, the above-mentioned barriers reduce the likelihood of the target population acting upon the advocated behaviour, such as getting tested for HIV and AIDS.

It is thus important to increase awareness of HIV and AIDS to such groups. More effective communication about the disease and greater flows of information are central to the success of AIDS strategies, and for reducing the vulnerability that flows to and from HIV infection. Information and communication are sources of power in an epidemic characterized by its lack—they confer the power to protect against infection, to influence decision makers, and to lead lives of dignity and equality once infected. In a region often characterized by resource limitations and fragmented infrastructures, information and communication are two of the most critical and abundant resources available in the fight against HIV and AIDS. They are both the prerequisites and enablers of an effective response.

⁴ More information is available on the following website: <http://www.aidsalliance.org/HomePagedetails.aspx?Id=1> (Accessed March 10, 2011).

This study posits that mobile phone technology, whose rapid growth in Uganda provides an avenue to reach millions with HIV and AIDS messages in a relatively easy, practical and cost effective way, may be a new tool for HIV prevention and awareness campaigns.

1.3 The Case Study

1.3.1 Text to Change (TTC)

Text to Change, a Dutch funded non-profit organization in Africa, has been using mobile technology for health education since 2006. Combining the need for innovative health education with the growth in use of mobile phones, TTC has been running a fun, innovative and practical HIV and AIDS education program in three countries; Uganda, Kenya and Namibia. This program not only educates participants about AIDS but also encourages infected patients to seek medical help and adhere to medication⁵.

1.3.2 The process

TTC runs a six-week SMS based quiz program with participants receiving three questions per week. The quiz participants answer by sending a free text message. The correct answer is acknowledged with additional information on the topic and the wrong one by an explanation about the correct answer. Detailed information on weekly quiz issues are also put up in a local newspaper and on the TTC website. At the end of the program, participants visit a Voluntary Counseling and Testing (HCT/VCT) centre where they are provided with free HIV and AIDS counseling and testing. Participants who provide correct answers also have an opportunity to win prizes such as mobile phones and air time (talk time minutes).

1.3.3 The pilot project

Text to Change offers an interactive mobile SMS quiz with knowledge questions linked with a rewarding system (incentive). In this study, TTC's pilot project, which was launched February 14, 2008 in Mbarara District, Western Uganda is used as a case study. The project, which was pioneered in Uganda is an initiative aimed at increasing awareness on HIV and AIDS through

⁵ Text to Change webpage: <http://www.texttochange.org/> (last accessed December 10, 2010)

information giving by use of mobile phone text messages. The project's goal was to increase HIV and AIDS awareness and encourage participants to access HIV Counseling and Testing (HCT) services. The TTC pilot project ran from six to eight weeks targeting Celtel Uganda (now Zain) subscribers from the selected Mbarara region. The target group was 15,000 participants with AIDS Information Centre (AIC) Mbarara Branch being the HCT service provider.

Participants received interactive text messages in form of multiple choice questions on their mobile phones. When answered correctly, automatically guaranteed a participant free HCT services and at the same time qualified to enter into the draw to win various prizes.

1.4 Research objectives

This paper presents an evaluation of a mobile phone based approach designed to improve HIV and AIDS awareness. Specifically, the paper seeks to assess the potential of mobile phones to deliver HIV and AIDS education through incentive-based SMS quizzes in the selected area of study. The goal of deploying HIV and AIDS related quizzes to the general population is to increase awareness and knowledge about HIV and AIDS, to promote healthy behaviour and to encourage people to know their HIV status and seek treatment if necessary.

The specific objectives of this study are to;

- to establish whether the SMS quiz is an effective channel of delivering HIV and AIDS education/awareness.
- assess, knowledge, attitudes and perception of target populations on the use of mobile technology for HIV and AIDS education. investigate the status of mobile health (mHealth) in Uganda
- understand the demographic characteristics of users and non-users of the SMS quiz project.

1.5 Research questions

The following research question helps explore the efficacy of using text messages for HIV and AIDS education.

RQ1: How are text messages being used by TTC to create HIV and AIDS awareness among users? a)What are the milestones? b) What are the challenges?

RQ2: To what extent is mobile phone based SMS quiz program appropriate channel for delivering HIV and AIDS education among users?

RQ3. a) To what extent do the project participants who own a mobile phone use the medium for accessing HIV and AIDS information?

b) To what extent do the project participants who own a mobile phone use the text messaging (SMS) for HIV and AIDS education-related purposes?

RQ4. To what extent is the mobile phone used for HIV and AIDS education in relation to other communication channels?

RQ5. To what extent is the SMS use for HIV and AIDS education determined by age?

1.6 Significance of the study

This research on the use of mobile phones for HIV and AIDS education may be the first of its kind in Uganda. It may contribute empirical evidence that support some of the previous theoretical developments and insights from qualitative research on the use of mobile phone technology for HIV and AIDS awareness programs. It may also enhance previous solutions to HIV and AIDS knowledge gaps in Uganda.

1.7 Structure of the study

This study is presented in six chapters. Chapter I includes the background of the study, statement of the problem, objectives of the study, research questions and significance of the study.

Chapter II presents a review of the literature. It explores existing literature on the use of ICTs especially mobile phones for healthcare in Africa, mobile communications in Uganda, mHealth in Africa, text-based healthcare initiatives and Text Messaging Services (SMS). It also includes a review of some recent studies on the use of mobile phones for health interventions. The contribution of mobile phones in developing countries is also presented in this section and finally, the limits of mobile telephony and missed opportunities are presented.

Chapter III presents the theoretical framework used as the basis for making analysis. It includes a review of the Domestication studies, a brief history of the concept of domestication of media and communication technologies. It also presents an outline of the domestication model and the application of the model to mobile phone use.

Chapter IV describes the methodology used in this study. It includes the research procedures, data collection methods and analysis procedures.

Chapter V presents the study the finding of the study. It also presents analysis of the responses. Chapter VI provides a summary of the entire study, a concluding discussion of findings, implications of the finding for theory, practice and research. It also presents some recommendations for further research.

2 Literature review

2.1 Introduction

The expansion and adoption of new methods of communication provide new opportunities for delivering health information. This section reviews the previous research examining mobile telephone short-message service (SMS) for delivering health behaviour change interventions. The SMS service has wide population reach, can be individually tailored, and allows instant delivery with asynchronous receipt, suggesting open opportunities for delivering health behaviour interventions.

It should be noted that mobile communications in developing countries differs radically from that of western countries. Communication is mostly passive, taking the form of receiving calls rather than calling. Young people use the cellular phone just to receive calls from their families and relatives. The preferred mode of communication is to send and receive low cost SMS (text messages), using pay as you go cards rather than a subscribed line. Some of these contrasts have been emphasized while presenting the promise that mobile phones present for health education.

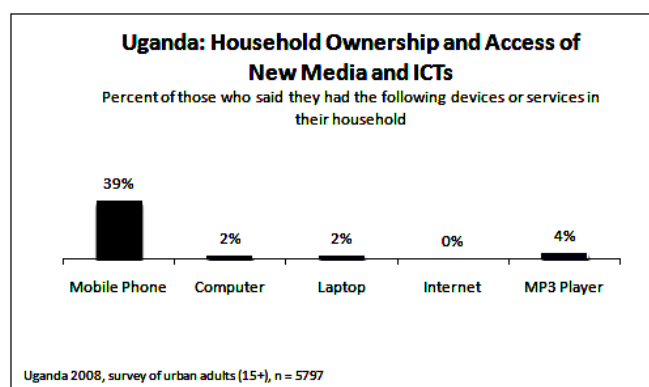
2.2 Mobile communications in Uganda

Uganda's mobile communications market has registered strong growth in recent years. According to the Uganda Communications Commission (UCC), there were about 9.5 million mobile subscribers in August 2009, an increase of 3.3 million from a year earlier.⁶ The number of overall minutes being used has also nearly doubled.

The increase in subscriptions, along with substantial tariff discounts, resulted in a total of 6.6 billion minutes being billed during the fiscal 2008/2009, versus 3.5 billion minutes in the previous fiscal year.

⁶ Uganda Communications Commission (UCC) website: <http://www.ucc.co.ug/> (last accessed October 20, 2010)

Table 1. Shows Uganda’s household ownership and access to new media and ICTs



The UCC attributes this market growth to the expansion of area service coverage and the introduction of new market competitors. Competitors are now offering a wider variety of services and plans along with cheaper introductory packages. There are now seven mobile phone service providers ranging in size and service capabilities. The first provider was Celtel (Zain Uganda) which began service in December 1994. The providers to follow were MTN Uganda in 1998 and Uganda Telecom in 2001. Orange and Warid Telecom entered in early 2008; I-Telecom debuted in September 2009 and targeted more affluent Ugandans with such offerings as mobile broadband internet and fast data services⁷. At the end of the fiscal 2008/2009, the UCC estimated that some 310,000 Ugandans have access to mobile phone.

Smile Telecom, which began providing mobile services in December 2009, targets low income Ugandans who may not be able to afford the cost of a handset. Smile gives customers their own telephone numbers and voice message boxes, and secure personal identification numbers to use on any Smile Communications phone. Customers can then make a call through company agents at street kiosks or stalls or at Smile pay phones.

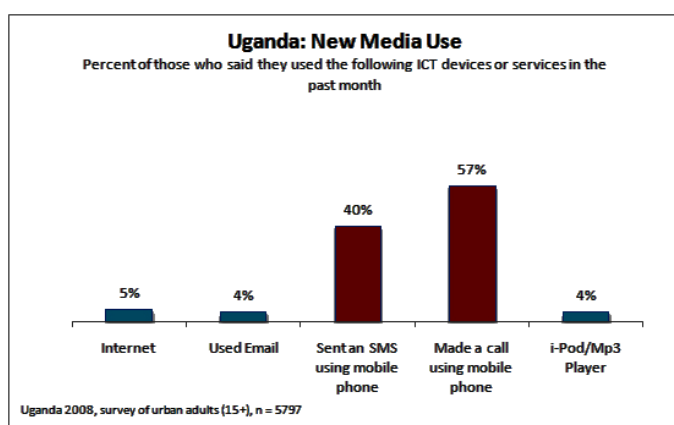
According to AudienceScapes⁸ Uganda’s national surveys conducted in 2007 and 2008, household access to a mobile phone has increased some 18 percentage points from 21 percent of households to 39 percent. Similarly, the use of SMS text messaging and voice calls increased 16 percentage points and 15 percentage points, respectively. *See table 2 below.*

⁷ Nshekanabo, Aggrey. “Sixth Telecom Lands in Uganda”. East African Business Week. 26 September 2009. Available at: http://www.busiweek.com/index.php?option=com_content&task=view&id=2349&Itemid=34 (Accessed January 30, 2010)

⁸ <http://www.audiencescapes.org/country-profiles/uganda/country-overview/mobile-communications/mobile-communications-284> (last accessed January 1, 2011)

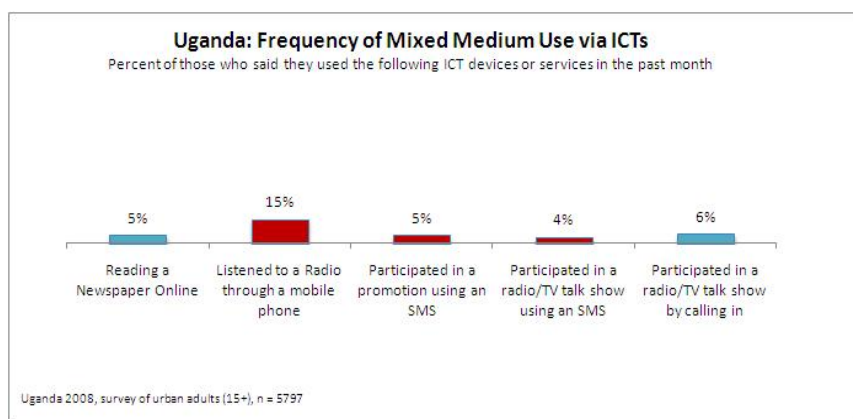
The decrease in cost and service expansion to more rural areas has also allowed Uganda's less affluent citizens to take advantage of the connectivity that mobile phones provide. Household access among Ugandans with a low socio-economic status (SES) tripled from 2007 to 2008 from 5 percent to 15 percent. Access among individuals with a lower middle-SES more than doubled from only 13 percent to 31 percent. Even so, high-SES Ugandans are more than twice as likely to have access to a mobile phone as those with a lower middle-SES.

Table 2. Illustrates Uganda's new media use



The survey has also shown that Ugandans are adept at gaining access to telephony other than using a personal mobile phone. Although 15 percent of low-SES individuals said they have household access to a mobile phone, 33 percent reported making a mobile phone call at least monthly. This is even a habit among high-SES users, as 71 percent have household access and 85 percent make a phone call at least monthly. Users may have borrowed a mobile phone from a friend or family member or visited a kiosk for a one-time use payment.

Table 3. Shows the frequency of mixed medium use via ICTs



A number of mobile providers now offer mobile money transfers and the ability to “top up” the minutes of another user (an effective proxy for transferring money). In March 2009, MTN Uganda launched its mobile money transfer service, as did Zain with its Zap service in the summer. In addition Uganda Telecom announced a partnership in 2009 with Redknee Solutions to soon offer its own mobile transfer service⁹.

By October 2009, the MTN and Zain services together had signed up about 250,000 users; MTN said its service handled an average of sh6 billion transfers a month¹⁰. In addition to their domestic services, both MTN and Zain announced the launch of global money transfer services, allowing users to send and receive remittances outside of Uganda¹¹.

There have been a number of development and social change projects seeking to capitalize on the communicative power of mobile phones. A recent venture between the NGO Text to Change (<http://www.texttochange.com/>) and the AIDS Information Centre of Uganda (<http://www.aicug.org/>) conducted a month-long program using SMS-text messaging in the district of Mbarara and encourage the public to seek HIV counselling and testing services. TTC is a Dutch non-profit organization founded in 2006 that seeks to develop ICT systems to inform and educate about health issues. TTC is a complementary service provider using mobile telephony as a medium to communicate about health-related issues to support (existing) health communication campaigns. The TTC project tries to increase awareness about HIV and AIDS through information by using mobile phone SMS quizzes, with the aim of encouraging participants to use HIV Counselling and Testing (HCT) services.

⁹ Odomel, James. “UTL Partners with Redknee to offer transfer service”. New Vision. 25 February 2009. Kampala, Uganda. Available at: <http://www.newvision.co.ug/D/9/32/672639?highlight&q=redknee>. (Accessed January 10, 2010)

¹⁰ Mugabe, David. “Telecom Money Transfer Tilts Market”. New Vision. 7 October 2009. Kampala, Uganda. Available at: <http://www.newvision.co.ug/D/9/32/697046?highlight&q=MTN transfer>, (Accessed January 10, 2010)

¹¹ Mugabe, David. “MTN to start global mobile money transfer”. New Vision. October 2009. Kampala, Uganda. Available at: <http://www.newvision.co.ug/D/9/32/697830?highlight&q=MTN transfer>. (Accessed January 10, 2010)

2.3 Use of ICT for health care in Africa

Penetration rate for a range of ICT in Africa has been increasing tremendously for the past decade, even though it has yet to be on par with that of developed countries. Since 2001, the internet is accessible from every capital city in Africa, up from a mere four cities in 1997 (Jensen, 2001). The proliferation of ICT in Africa thus opens new possibility for health communicators to reach a larger audience base with greater ease.

A review of ICT policies and practices in low income countries, including those in Asia and Africa, revealed that the telephone is a preferred mode of communication in Africa (Gerster & Zimmermann, 2005). The authors of the review cited the cultural norms of Africa as one of the reasons for this preference, in that certain topics such as sexuality related issues, are considered taboo. Hence individuals rely on the telephone for the exchange of sensitive information, since it allows for some privacy. This anonymity is enhanced with the advent of the text messaging services.

However, mobile phone penetration rate varies widely in continental Africa, with the highest percentage residing in South Africa, standing at 92.2%, and the lowest in Eritrea, at merely 2.2%. Uganda falls at the lower end, with a penetration rate of about 27% (Private Sector & Development, 2009). Hisali (2007) pointed out that the slow growth of the telecommunication industry in Uganda, as well as the slowdown in mobile phone services usage in the recent years might be due to the high taxes imposed on mobile services. The country's mobile phone usage tax as of 2007 is 30%, the second highest in the world. However, the general upward trend for mobile phone penetration rate in Africa (Private Sector & Development, 2009), coupled with the Grameen "village phone" concept (Donner, 2008; Grameen Foundation USA, 2005), whereby multiple users share a mobile phone, suggests the potential of utilizing the medium for large scale campaigns including HIV and AIDS education.

2.4 Contribution of mobile phones to health in developing countries

One of the key problems faced by healthcare workers in rural areas in developing countries is the lack of information and communication networks. Meeting health workers' information and communication needs is potentially the most appropriate strategy to improve healthcare in rural

areas of developing countries (Pakenham-Walsh, Priestley and Smith, 1997 and Metin, Villeret et al., 1997)¹².

The great expansion of mobile phones in developing countries involves new opportunities to improve efficiency, productivity and communication in the health sector, and help to achieve better quality services at reduced cost. Universally, mobile technology has six main intrinsic features appropriate for its adoption in developing countries: low infrastructure investment, ease of use, low energy consumption, affordability of services and devices, surpassing unfavorable geographic structures and less vulnerability to vandalism and natural disasters than other technologies.

Mobile technology has thus overcome many of the barriers “in a natural way” and revolutionized communications in many developing countries, even in rural areas, where connectivity is reached by the first time. In this sense, Heeks (2005) proposes a major effort to test the utility of massive mobile base for development purposes. Some of the applications for health include: management of health data, access to information for health workers, telemedicine and health promotion, as well as communication in emergencies.

Despite this potential, literature is scarce in mobile telephony’s application for health in rural areas. Some of the most remarkable experiences are: Satellife Project, which uses GSM coverage to download and transmit the information to PDAs through a jacket, the sending of SMS in Kenya for free with HIV and AIDS information for health promotion, including a free and anonymous service of questions/answers¹³; the campaign to educate people about HIV and AIDS and malaria using cellular technology sending free text messages in Mali (PlusNews, 2004); the adherence to tuberculosis treatments via SMS to remind patients to take their medication at pre-determined times in the *OnCue* project in Cape Town (bridges.org, 2005); the *Interactive Voice Response System* used in India for Electronic Helpline on HIV and AIDS (Chandra, 2005); the Mobile for Good project in Kenya, based at using mobile technology to improve the lives of people, among others, with health services such as SMS-based health tips or anonymous questions about HIV and AIDS and Breast Cancer for subscribers.

¹² Quoted from report available at: <http://www.bmj.com/content/314/7074/90.full> (accessed January 1, 2011)

¹³ More information available on this site: <http://www.genderit.org/content/hivaids-and-mobile-technology-sms-saving-lives-africa> (visited January 20, 2011).

The above cases however are merely anecdotal experiences that show how mobile phones are increasingly considered as a tool to meet health needs in developing countries and how there is a growing debate in the ICT4D community in order to explore the benefits of mobile telephony for health in developing countries; however, this field is still very recent and there are very few academic papers regarding the same.

2.5 The limits of mobile telephony and missed opportunities in Africa

Despite the growing opportunities of mobile phones, many people in Africa are still marginalized or excluded from accessing the benefits of the technology because of barriers that include cost and the lack of adequate regulation and policy. Mobile telephony may contribute to widening the gap between the poor and the poorest, leading to what Manuel Castells has defined as the ‘fourth world’ – a non-consuming and non-producing marginalized group which is ‘structurally irrelevant in the current structure of the global economy (James Katz, 2008). For example, within the informal construction sector in Dar es Salaam, Tanzania the use of mobile phones is broadly ‘stratified along employment lines’ as employers and middlemen own mobiles while many employees, apprentices, and family labourers are unable to afford a handset, let alone the running costs. However, more data on usage are needed to inform this debate about the digital divide. Current figures refer mostly to the number of subscribers (those who have a sim card) and owners (those who own a mobile handset), rather than specific patterns of use and users.

Cost and usability problems restrict many from benefiting from the full functionality of mobiles. Often people are limited to ‘beeping’ to curtail costs. A widespread practice in Africa, this involves dialing a mobile phone number and hanging up before the owner can answer. Often these beeps mean the mobile owner should call back, but they can also relay a planned message.

The difficulties of scaling up mobile phone technology have also been highlighted by development practitioners and grassroots NGOs like Text to Change. The pilot veterinary project conducted in Zanzibar, for example, revealed two major obstacles: the mobile phones are very expensive for local vets, and the on-screen forms need to be completed in a specific order, which can be problematic when conducting physical checks on animals.

Government restrictions and state control have also been shown to hinder the growth of the mobile phone sector. For instance, Burundi, Djibouti, Eritrea, Ethiopia, and Somalia – all characterized by a state telecommunications monopoly or the lack of strategic investors – are the only five countries with mobile penetration rates of less than 10 percent¹⁴. Thomas Khalil has argued that the lack of competition in these countries is the main cause of the low mobile penetration rate, as it discourages private sector investments and consequently impacts on the cost of mobile services.¹⁵ Such state monopolies are often motivated by political factors. For example, during the 2005 election the Ethiopian government shut down the text messaging system, which was being used by the opposition for mass communication; at times the ruling party also distributed misinformation via text messages¹⁶.

The above notwithstanding, millions of Africans have benefited from being able to communicate instantly and relatively cheaply with family, friends, businesses, and services because of mobile telephony. Mobile phones have clearly had a revolutionary impact on many lives, but not all. There is also now a vibrant and growing critical mass of technologists, entrepreneurs, and activists experimenting with new ideas in the mobile sector.

2.6 mHealth

The ubiquitous nature of mobile devices, coupled with their portability, makes it convenient to disseminate messages to the audience, even for developing countries and rural regions. Past research showed that mobile phones and personal data assistants (PDAs) were effective in improving public health in Africa as well as other parts of the world. They have aided accurate collection of patients' medical records, facilitated mass dissemination of information by healthcare providers, and served reminders for adherence to medical regimens.

A recent mobile phone-based pilot program conducted by the UNICEF was successful in gathering more accurate data about children's nutrition-related information in Malawi (Blaschke, Bokenkamp, Cosmaciuc, Denby, Hailu, & Short, 2009). The Rapid SMS campaign made it easier for the participants to provide information about their children, and at the same time, it was

¹⁴ UNCTAD, Information Economy Report, p. 4

¹⁵ Thomas Khalil, 'Harnessing the mobile revolution', p. 21

¹⁶ Fahamu, 'Mobile phones, human rights and social justice in Africa' (Report, Fahamu, Oxford, 2007); Lahra Smith, 'Political violence and democratic uncertainty in Ethiopia' (Special Report 192, United States Institute of Peace, August 2007).

more convenient for the administrators to access the data. In the past, individuals had to visit the clinics physically for the body measurements of the children to be taken and recorded, which resulted in high attrition rates and out-dated information.

Similar studies are conducted in Kenya using the PDA for collecting patients' medical records (Tegang, Emukule, Wambugu, Kabore, & Mwarogo, 2009; Diero et al., 2006). The authors found that despite logistical problems, such as battery outages, limited storage space, and accidental loss of data, the PDA was able to collect more accurate data, as the participants were not allowed to skip any of the questions, and inconsistencies were corrected on the spot. Moreover, since the data is stored electronically, it was ready for analysis soon after collection.

In the sexual health context, texting services were seen as effective in encouraging enquiries among youths about sexually transmitted infections and related issues to access relevant information (Levine, McCright, Dobkin, Woodruff, & Klausner, 2008). It was revealed that the nature of the platform attracted the audience's attention; in addition, the increase in awareness level of the health issue was the highest among individuals who signed up with the least expensive cell phone providers. This suggests that the accessibility and the convenience that a medium provides play a crucial role in determining the success of an intervention program.

Mobile services had also been utilized for reminder services for adherence to antiretroviral drug usage among HIV patients (Puccio et al., 2006; AIDS alert, 2005). A 24-week long study conducted by Puccio et al. showed that even though most participants felt that the reminder calls for the administration of antiretroviral medicine were useful and not overly intrusive, the adherence to the therapy waned after termination of the reminders. This highlights the problem of sustainability beyond the intervention period.

Despite reports of effective application of mobile devices to healthcare, a review on research on impact of e-health technologies in developing countries revealed that most of the evaluations conducted are limited and that there was a lack of solid evidence (Blaya, Holt, & Fraser, 2008). Blaya et al. (2008) noted that few studies presented scientifically rigorous data, and that most of the studies did not have patient outcomes as an endpoint, hence the benefits of using e-health systems are difficult to quantify. This calls for more concrete evidence of the impacts of electronic and mobile technologies on healthcare and health communication.

2.7 Text-based health initiatives

The rapid diffusion of mobile communication technology has provided users with easy and inexpensive access of technological affordances. Text messaging is one example. The technology is referred to as Short Message Service (SMS) and allows users to share messages up to 160 characters in length between handsets. Text messaging has two advantages: it is relatively inexpensive and it is asynchronous, so recipients of text messages do not have to read the message immediately (Ling, 2005). The popularity of text-messaging provides a unique platform for healthcare professionals to communicate with patients.

SMS alerts provide the further advantage of being relatively unobtrusive, offering recipients confidentiality in environments where disease (especially HIV and AIDS) is often taboo. In the developing world, SMS alerts have proven particularly effective in targeting hard-to-reach populations and rural areas, where the absence of clinics, lack of healthcare workers, and limited access to health-related information all too often prevent people from making informed decisions about their health.

SMS campaigns can be set up either as one-way alerts or interactive tools used for health-related education and communication. For example, a citizen may sign up to take a survey, delivered via SMS message, quizzing them on their knowledge about HIV and AIDS and the location of the nearest testing centre. Depending upon their responses, information regarding where and how to receive a free test will be transmitted. This interactive model has been deployed in several countries (e.g., India, South Africa, and Uganda) to promote AIDS education and testing and provide information about other communicable diseases (such as TB), as well as to promote maternal health and educate youth about reproductive health.

While other communication media, such as radio, television, voice-based information hotlines, and even interactive websites can be employed in the service of education about public health issues, SMS stands out as having several advantages over each of these: cost-effectiveness, scalability, convenience, broad reach, and widespread popularity in the developing world. By promoting health-conscious behaviour, the mHealth education and awareness programs currently in place have already had positive impacts. The ubiquity and low cost of SMS messages hold the potential to shift the paradigm for health education by communicating with people in an accessible, engaging manner that both respects their privacy and gives them the tools to make informed choices.

This research seeks to examine text message initiatives prove an effective and inexpensive way for health practitioners to keep in touch with target audiences. Communication is an essential component in establishing a meaningful relationship with physicians (Haeen, Ray & Allegrante, 2008). Mobile technology is able to bridge communication gaps by providing opportunity for fast, unobtrusive and personalized medium of communication.

In this study, 'comfort with HIV and AIDS mobile text communication' draws upon existing literature on text messaging healthcare campaigns/initiatives. It is operationalized as respondents' willingness and comfort to communicate with their healthcare provider. This includes whether respondents feel comfortable having personal medical information sent to them through text messages. It also examines whether or not respondents' prefer a text message reminder about a doctor's appointment, or to receive mobile phone text messages to remind them of personalized health objectives. This study aimed to model the variables that predict individuals' comfort with healthcare text messaging, specifically, the predictive value of individuals' mobile phone use and their perception of text-based programs.

2.7.1 Text Messaging Services (SMS)

Different information transmission technologies in mobile phones include Short Message Services (SMS), Multimedia Messaging Service (MMS), Voice Technology and Video Technology. SMS employs the sending of short messages between mobile devices. These could be plain full text messages or messages grouped by keywords. Within the context of the digital inclusion problem defined, users can send full text SMS to the system to request for HIV and AIDS information as responses.

The system can also be used together with faxes and emails to allow for files larger than the normal SMS file (160 Characters) to be sent to users as responses. MMS allows for sending of messages that have multimedia objects such as images, audio, video and rich text. This method of data representation involves grouping information or ideas and representing them by graphical images. In the digital inclusion solution the system can allow for sending of picture messages to users as reminders of different events such as time to take medication, facts about HIV among others.

Text messaging has been one of the most successful mobile services recent years. Currently, SMS is used either for mediating person to- person communication or for accessing mobile end-user

services. While previous studies focusing on media richness suggest this type of mediated communication is useful for the performance of less equivocal tasks and the exchange of formal messages (Daft and Lengel, 1986), recent research gives more mixed predictions. For example, it has been suggested that the low channel capacity of text messaging (Te'eni, 2001) is compensated by including more affective components in the message. This also leads to an adjustment of message content such as reduction of content formality, something that is typically observed in behavioural studies of text messaging use (Kaseniemi and Rautiainen, 2002). However, Höflich and Rössler (2001) found that instrumentality was the only gratification significantly predicting the use of text messaging services. Although SMS is mainly used for purposes of utility, the inclusion of affective components and low formality in messages means that SMS have the potential for entertainment in addition to utility.

The key advantage of the SMS is its *relatively* cheaper costs but it also has a huge disadvantage of being able to allow only 160 characters. Secondly, most key pads do not support local languages, it requires users to type and read responses in English hence may be a constraint to the target users.

3 Theoretical Framework

3.1 Introduction

In order to understand the factors affecting people's intention to use and adopt mobile services, it is necessary to get a thorough understanding of the theory behind it. Research on innovative use of services like text messaging and simple SMS-based services may provide important insights into understanding the process of mobile service adoption for health care service delivery. In this study, the Domestication of Media and Technology is examined to understand what role mobile phone text messaging plays in HIV and AIDS education.

3.1.1 Theoretical review

In this section, the history and literature on Domestication studies, and the mobile phone in society is briefly reviewed in to illuminate on the application of mobile technology for health education. Emphasis is put on studies that focus on the use of mobile text messages for HIV and AIDS awareness and education.

3.1.2 Domestication, a brief history of the concept

Domestication is described as the process of technology adoption into everyday life. The concept of domestication was originally adapted from other disciplines such as anthropology and consumption studies, as well as from media studies considering the context in which ICTs were experienced by the people using them (Haddon, 2006). According to Haddon (2006) the framework looks beyond the adoption and use of ICTs (as well as gratifications or benefits) to ask what the technologies and services mean to people, how they experience them and the roles that these technologies can come to play in their lives. The processes observed in this framework are about how individuals encounter technologies and deal with them, sometimes rejecting them and at other times accepting them (Haddon, 2006).

Domestication may be seen as a dynamic process, wherein individuals and groups negotiate the use of a technological device, trying to 'fit it in' or 'break it into' their own personal life structures and domestic space to best satisfy their needs and wants. Just as consumers modify the use of a device, the device in turn impacts and influences their daily life. The term itself calls to mind the taming of wild animals, suggesting that technologies must be housebroken if they are to become

part of the home and family (Berker et al., 2006). This is a confrontation that does not always end well. Sometimes technologies are successfully domesticated into the routines of everyday life while other times they are not. But the process is never quite complete. Even those technologies that appear domesticated might one day face rejection from the household.

3.1.3 The concept

Domestication is a concept dealing with how ICT becomes integrated into people's daily life, or how ICT "find a place in people's life" (Haddon, 2003, p.43). The major argument of this theory is to treat technological innovation as a process, not an event (Silverstone & Haddon, 1996, Silverstone, 1999, and Haddon, 2003). By process, Silverstone and Haddon mean that to discuss technological innovation and adaptation is not just to discuss the producing of technology. Instead, other factors including social, cultural, economic, political, and individuals involved in the process should also be considered.

The process of domestication is a two-way process (Silverstone and Haddon, 1996). On the one hand, Silverstone (1999) believed that media, which to some extent are represented and facilitated by ICT, are so embedded in human's everyday lives that we can hardly talk about our home without talking about them. On the other hand, Silverstone and Haddon (1996) opposed the role of technological determinism in the process of technological innovation and adaptation. They argued that other factors, such as social and economic dimensions, involving in the process provide crucial feedbacks to the design process of technology, which reflect the necessity of domestication and further promote the development of the technology.

In this paper, the researcher employs the domestication framework as the lens to understand:

- ✓ how the Text to Change are 'domesticating' SMS quizzes for HIV and AIDS education in the community where they operate.
- ✓ the factors affecting integration of mobile phone-based quizzes for HIV and AIDS education in those communities.

The domestication framework has been used to study the adoption processes of a variety of technologies including personal computers, televisions and mobile phones (Perdesn & Ling, 2003). Again it should be noted that although the framework is mainly used to study person or household adoption of technology, others recommend that it can also be used to study

organizational domestication of technology, for instance, Habib (2005), used domestication to study the adoption of learning management system at a university.

An important concept to note about domestication is the moral economy of the household, described as a kind of shared value system unique to each home and family. Many domestication studies have criticized these concepts, arguing that empirical reality does not reflect such rigid categorizations (i.e. Bakardjieva, 2006). Although some of the original terminology has fallen out of favor in recent years, the focus remains on studying ICT use in a particular social context.

3.1.4 The Domestication model

This section provides an overview of the ‘domestication model’ as outlined in Silverstone *et al.* (1992) and later reworked by Silverstone and Haddon (1996), and uses it as a basis for a new model, more specifically adapted to the case of mobile telephone usage for HIV and AIDS education.

3.1.5 Outline of the model

Several research works (Akrich, 1992; Cawson, Haddon and Miles, 1993; Haddon, 2002; Silverstone and Haddon, 1996) argue that technological innovation cannot be reduced to the process of producing an artefact. They emphasize the need to take into account processes of consumption and use of the technologies to fully understand the notion of innovation. Hence, they portray technological innovation as not solely the result of an engineering effort, but also the product of a multitude of interrelated activities involving the producers of a particular technology, its consumers and the other actors that play a role in the process of acquisition and consumption of the technology. From this perspective, technologies are social, cultural, political and economic products: “they are symbolic and aesthetic as well as material and functional” (Silverstone and Haddon, 1996, p. 45). Silverstone and Haddon (*ibid.*) propose to distinguish various dimensions of domestication, which are meant to provide a model to be used when

performing an analysis of the role information and communication technologies (ICTs) play in everyday life such as for HIV and AIDS education.

According to Silverstone et al. (1992), the domestication process is conducted in four phases or dimensions: appropriation, objectification, incorporation, and conversion, Silverstone, R., & Haddon, L. (1996).

3.1.6 Dimensions of Domestication

The first dimension, *appropriation*, is the process of possession or ownership of the artifact. This is the point at which an artifact moves from the world of commodity to the owner's possession, thereby, giving it significance, Haddon, L. (2006). In the appropriation, both actual and potential consumers are engaged in imaginative work where they view or hear about the artifact and the artifact is constructed not only as an object of desire to fulfill specific functions but also as a construction of the desire for difference and social meaning, Silverstone, R., & Haddon, L. (1996: pp. 44-74). Therefore, this dimension involves all transactions included in the passage of artifacts from the market to users' lives and motives for approaching to the product.

Second, through *objectification*, the users ascribe their cognitive values and aesthetics to the technology. Thus, the technology is given its meaning and place in users' lives. Objectification is expressed in usage but also in the physical dispositions of objects in the spatial environment. For example, after purchasing a technology, a user decides what role the technology should play in his/her life and where it is placed and displayed in the domestic arrangement.

Incorporation is the process during which artifacts are used in everyday life, and the level of functionality depends on how it is incorporated into everyday life. Technologies are selected with specific features in mind and should serve in the way users intend. However, sometimes, some technologies do not comply with users' intentions, and do not fit into the routines of users' everyday lives. Therefore, the incorporation dimension involves a number of usability issues in user experience research.

Fourth, there is the *conversion* process at which the product reaches a 'taken-for-granted' status to become a part of the user's life. Technologies are brought for a certain feature in users' mind, but

they may become functional in ways somewhat different from the intentions of designers or marketers. They may have many functions, but some of functions may change or disappear (e.g., many home computers brought for educational purposes have become game machines). Therefore, this dimension is relevant to unintended uses of technology, adaptations made by users, or features that users may desire in the future.

3.1.7 Key theoretical assumptions

There are several assumptions underlying the domestication theory, for this study only two key assumptions are picked; first, the emphasis is on consumption rather than mere use. So attention has been given to what ICTs mean to people, how they experience them and the roles ICTs can come to play in their lives. To understand both adoption and use we need to appreciate the negotiation and interaction between household members and the politics of the home which lie behind both conflicts and tensions and the formation of areas of consensus. Any understandings or even rules about appropriate use of ICTs which emerge from this process usually have some bearing on what people do with the technologies and services and in what circumstances. We have to be aware of individual, and household, strategies to control technologies, both in the sense of controlling use by others and controlling the place of technologies in one's own life - which in turn relate to the type of life and identity to which people aspire. And if we are to appreciate fully the symbolic dimensions of ICTs, we need to see aspects of consumption such as how technologies are talked about and displayed.

Second, adoption itself is seen as a process rather than an event. The pre-adoption process is captured perceptions of technologies and services, in how people imagine potential role of an ICT (or lack of one) in their lives and negotiations around, and sometimes resistance to, its acquisition. If acquired, there are then the processes of developing the above noted understandings about 'appropriate' usage (e.g. about how much TV to watch, what to use a PC for) - understandings which can themselves be challenged. There are the processes of fitting the ICTs into routines or creating new ones. And there are the processes by which usage of technologies spreads both among household members (which may mean lending out a personal phone to others) and in terms of what the technology is used for (e.g. from emergency use of the mobile to its role in organizing logistics).

3.2 Domestication and mobile phones

Domestication research has a long tradition of studying everyday life technology as the object being adopted (see Silverstone and Hirsch, 1992). Examples of technologies studied are fixed telephony (see Fisher, 1988), television (Silverstone and Haddon, 1996a) and home computers (Silverstone and Haddon, 1996b). Domestication studies are not limited to studies of individuals or aggregates, but are found describing the adoption and usage patterns of groups in society (e.g. Townsend, 2000) as well as individual end-users (e.g. Ling, 2001a).

A variety of explanations have been suggested in domestication studies of the widespread adoption of mobile services among young users. Most of these explanations have been applied in studies of text messaging adoption. Even though text messaging was not explicitly focused on by Ling (2001b), he indicated three conceptions of *fashion and style*, and suggested a development from “style as display” through “style as communication” to “style as a means to integrate social networks”. With these conceptions, the use of text messaging may be understood as both a way of communication and as a means of social integration that plays a role as style marker when the mobile phone itself has lost its significance as an object of style display. This is closely related to Skog's (2002) interpretation of the mobile phone as *symbolic capital*. These symbolic elements of mobile phone use have also been confirmed in studies of mobile phone use in organizational contexts (Manning, 1996). However, Manning (1996) found that the mobile phone was status -enhancing at some levels in the organization while it was status -reducing at other levels.

There is also a relationship between symbolic capital and *social capital* when the object of symbolic value is a communication medium. In that case, there is a relationship between style as a way of communication and style as an indication of group membership (Weilenmann and Larsson, 2000). This gives rise to the idea of text message sending, receiving, filtering and sharing as an expressive communication activity used to display style and social capital.

Because text messaging is asynchronous, discrete and stored (at least for a while), this particular use of the mobile is better suited as a style and social identity marker among experienced users than regular calls. These explanations all support the importance of including subjective norms as an important adoption determinant of communication services. The explanation of mobile service usage as “*ritual gift giving*” applies particularly to the explanation of text messaging services (Taylor and Harper, 2001). For example, Kaseniemi and Rautiainen (2002) observed three additional uses of text messaging besides regular peer-to-peer messaging; message collection,

chain messaging and collective reading. Most other studies of teenage text messaging use have reported similar behaviors (Ling and Yttri, 2002, Larsson, 2000).

Taylor and Harper (2001a,b) give references to alternative explanations of gift-giving behavior that fits the observed use of text messaging, such as ritual explanations rooted in primitive elements of our culture, but also sociological, social psychological and economic explanations of gift-giving have been suggested. Based upon this theory, text messaging may be adopted for social influence reasons (pressure to participate in the ritual gift-giving), or it may be explained instrumentally (in which text messaging based gift-giving practices are adopted for utilitarian reasons). In adoption research, the first explanations will be represented by subjective norms while the second will be represented by a reinterpretation of what is considered useful in a service (usefulness).

Ling and Yttri (2002) have suggested that text message adoption among teens may be explained by a theory of social learning and development (and emancipation) because text messaging are particularly well suited for exchanging ideas on issues focused in teenagers social learning (e.g. exploration of sexuality, social interaction). For example, many of the chain messages identified by Kaseniemi and Rautiainen (2002) were of sexual content and were used to explore and learn the limits of appropriate content in messages.

Another suggestion is that the asynchronous form of messaging is particularly well suited for initiating and exploring new relationships (Ling and Yttri, 2002). For example, Ling and Yttri (2002) mention several situations in which text messaging is preferred to voice because it is used as an awareness or initiating service similar to what Nardi et al. (2000) report for instant messaging services. Thus, a *social network explanation* is introduced in which the difference between teenagers and other users is explained by the social networks of teenagers being more dynamic.

In addition to these – mainly social – explanations of messaging service adoption and use among young users, there have also been some domestication studies following the line of reasoning from functionally oriented, work/leisure context studies. For example, Grinter and Eldridge (2001) studied the adoption of text messaging among teenagers and found that text messaging were preferred to other media because it was considered quicker, cheaper, easier and more convenient to use.

Karlsen et al. (2001) found a remarkable orientation towards usability and costs in their study of the potential adoption of mobile Internet services among Scandinavian teenagers. Thus,

instrumental or utilitarian explanations of the adoption of these services are relevant also for younger users.

In the context of these non-deterministic approach, it is of particular relevance for the domestication theory (Silverstone and Hirsch, 1992; Silverstone, 1994; Berker et al., 2006) to frame how users are always involved in processes of participation which comprise their multiple identities (consumers, family members, and so on). In fact, following the domestication model, users are able to engage with media and technologies to articulate the passage from the market to the home, and vice-versa, bridging different worlds through different stages and degrees of appropriation (symbolic as well as material).

Appropriation as such identifies the stage of domestication which corresponds to bringing something 'home', starting with making it familiar, intimate and known. Participation is meant to be, in this case, the possibility to 'welcome' something into everyday life: everyday life at home (but also beyond it) is the locus of participation as appropriation. Participation means domesticating the wild, something which is not familiar, to make it part of our daily horizon, practice and symbolic activity. It is about taming and bringing under control (Silverstone, 1994).

In this theoretical framework, both symbolic and material aspects of technologies are taken in consideration as driving the users' patterns of appropriation. It follows participation is a daily, ordinary activity, which makes users able to shape technology in the household or in other units (e.g. workplace, local communities and so on) so appropriate it according the specific characteristics and needs of their social settings. In this pattern of reciprocal adaptation between users and environments, technology and especially ICTs are shaped so to become different from what they were when designed and implemented. Domestication occurs with adaptation, negotiation and engagement by users.

Domestication studies showed coherently how uses at both a symbolic and a material level can be creative, drawing from a set of established patterns to re-locate and re-mediate the medium and the specific technology on which it is based. Both television and ICTs in the household have been studied as domesticated objects along a process of appropriation, objectification, incorporation and conversion (Silverstone, 1994).

The original four stage model proposed by Silverstone with reference to television has been revised and updated as not linear, but dynamic. This can be approximated to the use of mobile

phones for health education. It has been underlined, in this respect, that potential for domestication is not the same for all the users, that domestication can occur outside and beyond the home, and other factors than individuals or familiar contexts can affect the result of the process (Berker et al., 2006).

3.3 Taking Domestication outside the home

The concept of domestication, as the very term suggests, refers to the domestic environment of the home and family, and was originally conceived to study ‘fixed’ technologies such as the landline telephone and the home computer, which remain confined to the home. However, domestication studies have been successfully applied to environments outside the home (See for instance, Huijboom, 2005; Ling, 1997; Pierson, 2006).

Haddon’s outline of domestication for mobile telephony explores how the concept can be applied to technologies that are used outside the home, and are highly portable (Haddon L., 2003). Haddon however focuses more on how domestication can provide insight into the longer term evolution of the cell phone as a device, and whether it can be applied to study the ‘weaker’ ties of youth friendships rather than familial bonds. One could argue that the challenge in studying mobile telephony is also understanding how the phone rapidly changes functions as rapidly as people change their ‘roles’ in their daily lives.

3.4 Mobile phones in society

Fortunati (2002) has asserted that the cell phone not only changes aspects of social life, but alters even the framework that society functions under. The cell phone is a unique device, and can rightly be called revolutionary to a certain extent. While the device itself is not a pioneer of wireless communication, the extreme portability of its design and relative affordability (as compared to say a home computer, or a laptop) resulted in its ubiquitous use and especially rapid adoption by populations of developing economies. (Townsend, 2000, p. 2)

Geser (2005) states that cell phone are a “multidimensional challenge for sociological theory and research “(p.4). His classification of cell phone usage measurement into intensity, breadth and variety, provides a methodological starting point to define what ‘usage’ entails (p. 6).

Aspects of the cell phone that come prominently into play in this project are the device's ability to "[emancipate one] from local settings" (p. 9) and the importance of SMS (Short Messaging Service) as "a channel for low-threshold, non-intrusive contact initiation" (p. 18).

Geser mostly speaks of the emancipatory potential of cell phones as acting as 'symbolic bodyguards', for instance, using your cell phone in an isolated or unfamiliar environment will signal to strangers that you are busy, connected, and not to be harassed. However, cell phones can also emancipate one from familiar and safe settings.

SMS is highly suited for this particular environment where discretion is of utmost importance, and often real-time, extended voice conversations are impossible due to the increased possibility of being 'caught' in the middle of one. As Geser has explained, "the asynchronous mode is highly valued because it provides the opportunity of delaying the reception and the answering to a more appropriate time this same non-intrusiveness makes it easier for the new technology to enter all kinds of institutions despite dense social controls." (Ibid).

In addition, the tendency of the cell phone to create a 'virtual walled community' (Ling, 2004) enhancing familiar social ties at the expense of forming new ones, or connecting face to- face with people who are physically close to you, is particularly pertinent to this case study. This concern has also been echoed by Rivere and Licoppe (Haddon, 2004, p. 82) and Fortunati (2002). However, this creates a bold causal link between cell phones and behavioural choices. The principal of SMC in 2005 justified the ban on cell phones on campus by stating that students would rather spend their free time messaging their friends outside campus than form connections with their own classmates. This theoretical debate whether or not cell phones adversely affect sociability- therefore can be seen to be played out empirically in this case studies.

4 Methodology

4.1 Introduction

This chapter presents the methodology and research procedures used in the study. First, a case study approach is used to document the TTC SMS quiz project and develop an in-depth understanding of the SMS quiz among selected users. The data gathering process, problems encountered and how they were overcome are also included in this chapter. The section also offers a rationale for the research methods used to achieve the set out aims and objectives. The study used a mixed method approach which provided the opportunity to clarify findings in order to maximize the validity of the results.

4.2 Choosing a qualitative method

Qualitative research, broadly defined, means "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss and Corbin, 1990, p. 17). The goals of this research study were best accomplished by use of a qualitative research design approach. Whereas quantitative researchers seek causal determination, prediction, and generalization of findings, qualitative researchers seek instead illumination, understanding, and extrapolation to similar situations. In line with this, the study was aimed at providing an in-depth analysis of the project which could be linked to theoretical assumptions that explain how mobile-based technologies can be used in HIV and AIDS education and awareness. It also sought to examine the outcomes of such projects and issues surrounding their sustainability.

Many mobile studies are qualitative projects that rely on the classic methods of participant observation, interviews, or focus groups for their data collection. Some studies, however, have employed data collection techniques that specifically respond to the unique qualities of the mobile phone.

There are several considerations when deciding to adopt a qualitative research methodology. Strauss and Corbin (1990) claim that qualitative methods can be used to better understand any phenomenon about which little is yet known. They can also be used to gain new perspectives on things about which much is already known, or to gain more in-depth information that may be

difficult to convey quantitatively. This study seeks to an in-depth understanding of the potential of mobile phones to deliver HIV and AIDS education through incentive-based SMS quizzes.

Qualitative methods are appropriate in situations where one needs to first identify the variables that might later be tested quantitatively, or where the researcher has determined that quantitative measures cannot adequately describe or interpret a situation. Research problems tend to be framed as open-ended questions that will support discovery of new information. Qualitative research reports typically rich with detail and insights into participants' experiences of the world, "may be epistemologically in harmony with the reader's experience" (Stake, 1978, p. 5) and thus more meaningful. These have formulated an important decision to choose a qualitative method in this study.

According to Patton (1990), qualitative methods permit the evaluator to study selected issues in depth and detail. A researcher approaches field work without being constrained by predetermined categories of analysis which contributes to depth, openness, and detail of qualitative inquiry. Quantitative methods on the other hand, require the use of standardized measures so that the varying perspectives and experiences of people can be fit into a limited number of pre-determined response categories to which members are assigned (Patton, 1990: 13).

With a quantitative approach, Patton (1990) adds that it is possible to measure the reactions of many people to a limited set of questions, thus facilitating comparisons and statistical aggregation of the data. This gives a broad, generalizable set of findings presented succinctly and parsimoniously. By contrast, qualitative methods typically produce a wealth of detailed information about a much smaller number of people and cases. This increases understanding of the cases and a situation studied, but reduces generalizability (ibid: 14).

In this study, the nature of the research problem under investigation necessitated more depth and details to understand the factors affecting acceptability and adoption of the SMS quiz for HIV and AIDS education. The inquiry also necessitated some flexibility in dealing with varied sources relevant to the study. These requirements therefore made qualitative research methods take precedence over quantitative ones.

4.3 Triangulation as a technique

Triangulation is a powerful technique that facilitates validation of data through cross verification from more than two sources. In particular, it refers to the application and combination of several research methodologies in the study of the same phenomenon. By combining multiple observers, theories, methods, and empirical materials, researchers can hope to overcome the weakness or intrinsic biases and the problems that come from single method, single-observer and single-theory studies.

According to Maxwell (1998), qualitative studies generally rely on the integration of data from a variety of methods and sources of information, a general principle known as *triangulation*. This reduces the risk that a researcher's conclusions reflect only the systematic biases or limitations of a specific method and allows one to gain a better assessment of the validity and generality of the explanations that one develops (Maxwell, 1998: 88).

Patton, quoting Denzin (1978), identifies four basic types of triangulation; Data triangulation where a variety of data sources are used; Investigator triangulation where different researchers are used; Theory triangulation where multiple perspectives to interpret a single set of data are used and methodological triangulation where multiple methods are used to study a single problem or programme (Patton, 1990).

This study used data, theory and methodological triangulation. In order to strengthen the study design, triangulation was also used as measure to reduce the risk of systematic distortions inherent in the use of only one method, as well as strengthen the reliability, validity, and credibility of the study. In data triangulation, this study included views from a variety of sources deemed relevant for the research.

4.4 The Case Study approach

The central aim of this study is to describe in detail how Text to Change used an SMS approach to increase HIV and AIDS awareness and scale up HCT in Mbarara district, Western Uganda. The case in this study is the SMS QUIZ project implemented by Text to Change.

Case Study method enables a researcher to closely examine the data within a specific context. In most cases, a case study method selects a small geographical area or a very limited number of

individuals as the subjects of study. Case studies, in their true essence, explore and investigate contemporary real-life phenomenon through detailed contextual analysis of a limited number of events or conditions, and their relationships. Yin (1984:23) defines the case study research method “as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.” As noted by Yin, one should use a case study strategy because he or she deliberately wants to study contextual conditions. According to Gomm, Hammersley, and Foster (2000), case study refers to research that investigates a few cases in considerable depth.

Most scholars agree that a case study is not a particular method but a strategy (Stoecker, 1991, Yin, 1994). Stake (2000) also argued that a case study is not so much a methodological choice but a choice of what is to be studied. Yin (1994) argued that a case study should not be confused with qualitative research. Gomm et al. (2000) argued that a case study implies collection of unstructured data and qualitative analysis of data. However, most case study researchers (Yin, 1994; Stake, 2000; Stoecker, 1991) explained that a case study can employ the best of both quantitative and qualitative methods. Yin (1994) explained that a case study is a comprehensive research strategy that deals with situations “in which there will be more variables of interest than data points,” “relies on multiple sources of evidence, with data needing to be converged in a triangulating fashion,” and that “benefits from the prior development of theoretical propositions to guide data collection and analysis” (p. 13). This is the shape that this study takes.

Despite its strengths, Case Study method has always been criticized for its lack of rigor and the tendency for a researcher to have a biased interpretation of the data. Grounds for establishing reliability and generality are also subjected to skepticism when a small sampling is deployed. Often time, case study research is dismissed as useful only as an exploratory tool. Despite these criticisms, researchers continue to deploy the case study method particularly in studies of real-life situations governing social issues and problems. Case studies from various disciplines and domains are widely reported in the literature.

In the study of the TTC SMS quiz project, I do not believe the chosen single case will be one that accentuates generalizability. What I am attempting in this study is “a detailed examination of an event (or series of related events) which [I] believe exhibits (or exhibit) the operation of some identified general theoretical principles” (Mitchell, 1983, p. 192)

4.5 Methods and procedures

The goals of this research study were best accomplished by use of a qualitative research design approach. A procedure that was planned and systematic was needed, but flexibility was also needed.

This section provides a detail of the methods and procedures used to accomplish the set out objectives. In choosing the specific techniques to obtain data during this investigation, I was guided by the six criteria outlined by Bulmer (1993:10). a) *Appropriateness of the research objective*; whether the method chosen was capable of reproducing the kinds of data needed to answer the question posed in the study, b) *Reliability*; whether the method, if repeated by a different person at the same time, or the same person at a later point in time, would yield the same results on a second occasion? c) *Validity of the data collection methods*; whether I was able to obtain measurements of what I was really trying to measure, d) *Representativeness or generalizability of data collected*; to what extent I could transcend the sample in the case study to generalize about a wider population, e) *Administrative convenience*; this involved consideration of cost, time and speed of obtaining information.

Between 10 June and 20 July 2010, a field study was conducted in Mbarara district, western Uganda with support from Text to Change and the AIDS Information Centre, Mbarara. The field study was intended to assess the impact of the SMS quiz project deployed by TTC in western Uganda. Prior to the field study, contacts via telephone and emails were made to the interviewees by Text to Change to initialize the process. This provided a useful relationship between the researcher and the interviewees. The first step in the process of conducting the field study involved the development of instruments. The researcher in consultation with Text to Change developed interview schedules designed to determine the impact of the SMS quiz project and opinions of the end users towards the project.

4.5.1 Qualitative Interviews

Qualitative in depth interviews were chosen for this study. In-depth interviews are one of the most common qualitative methods. One reason for their popularity is that they are very effective in giving a human face to research problems. In addition, conducting and participating in interviews can be a rewarding experience for participants and interviewers alike. For participants – whether members of the study population or someone related to the population in a

professional capacity – in-depth interviews offer the opportunity to express themselves in a way ordinary life rarely affords them.

According to Kvale (1996), in-depth interview is a technique designed to elicit a vivid picture of the participant's perspective on the research topic. During in-depth interviews, the person being interviewed is considered the expert and the interviewer is considered the student. The researcher's interviewing techniques are motivated by the desire to learn everything the participant can share about the research topic. Researchers engage with participants by posing questions in a neutral manner, listening attentively to participants' responses, and asking follow-up questions and probes based on those responses. They do not lead participants according to any preconceived notions, nor do they encourage participants to provide particular answers by expressing approval or disapproval of what they say.

In-depth interviews are usually conducted face-to-face and involve one interviewer and one participant. When safety is an issue for the interviewer, the presence of two interviewers is appropriate. In these situations, however, care must be taken not to intimidate the participant. Phone conversations and interviews with more than one participant also qualify as in-depth interviews, but, in this module, we focus on individual, face-to-face interview.

In this study, face to face interviews were conducted with 10 respondents. Each Interview lasted between 15-20 minutes and these were conducted within the respondents' natural settings. Majority of the interviews were conducted in offices due to lack of spare time by most respondents.

Interviews were conducted with different categories of informants consisting of project implementers, sponsors, partners and other stakeholders listed below.

a) SMS Quiz project staff at Text to Change

The SMS quiz project planners and designers included purposively selected two TTC staff stationed at TTC offices. These included; Managing Director and Project Manager. These two personalities comprise the core team directly responsible for SMS quiz project.

b) Sponsors of the SMS Quiz programme

The SMS quiz is sponsored mainly by telecommunication companies in Uganda as part of their Corporate Social Responsibility (CSR) Programme. This study sought to get views from Zain, a lead sponsor of the SMS quiz project. This company was chosen because it has been part of the

TTC SMS projects since its inception. Two Interviews were held with the people directly responsible for TTC projects at Zain.

a) **Officials from key partner Non-Governmental Organization (NGOs) and Government**

Four NGOs were selected; AIDS Information Centre, HIPS Project, Kawempe Health Care and Health Child. One official was interviewed from each of these organizations. Face to face interviews were also conducted with two officials from the Uganda Communication Commission (UCC).

4.5.2 Focus Group Discussions

Focus groups are a free-form of discussion by a group of people led by a moderator designed to obtain information about some topic, (Berger, 2000: 122). It is a vital method for qualitative data collection because it is good for exploring a wide range of issues.

The method of focus group discussions possesses elements of both participant observation and individual interviews (Morgan 1988 in Madriz, 2000). It has of recent grown in popularity and recognition as a valuable method for qualitative data collection. The reason for this is because it is a good method for exploring a wide range of issues (Colucci, 2007). Due to the fact that humans are 'social' beings, they have long been gathering together and discussing important issues in groups. It is this element of human behaviour that researchers used, refined and made into a method of research (ibid).

Wimmer and Dominick (1997:97) suggest that focus group discussions are vital as pilot studies so as to detect ideas that could further be investigated using other methods. This technique of interviewing participants in a group enables a researcher to attain information on trends and variances, reasons and causes through the views of respondents (Yin, 1994:182).

I conducted one focus group discussion with some project participants of the Quiz Project. The focus group comprised of 10 participants and a moderator. The moderator who was chosen by TTC was fluent in both English and Lunyankole. She helped with translation of difficult concepts and issues during the sessions. The participants were chosen randomly from the group who participated in the SMS quiz program in 2008. The discussions were held in the local council

where the participants live. The participants from these three groups were made of both females and males ages of 15-45 who are the active users of cell phones and participated in the quiz program. A tape recorder was used to capture the proceeds of the discussions and these were later transcribed into text.

Data gathered from these focus groups was qualitative because “data from the focus groups do not lend themselves to quantification” (Berger, 1989: 91). This is the case because “the aim of the focus group discussion is not to build consensus, but ... to find out what each member of the group thinks about the topic under discussion, and to elicit from each member his or her opinions and descriptions of the behaviour of interest”(Berger, 1989: 95).

After the focus group discussions, participants completed survey questions. The content of the survey questionnaire includes questions about basic demographic characteristics, the kinds of information participants would like to receive via the SMS quizzes, current sources of information on HIV and AIDS, access to and use of mobile phones, problems in the participant’s life, and perceptions of and attitudes towards SMS quizzes. These questions were drawn from the first few qualitative interviews and from consultation with members of Text to Change, as well as from the brief for the study. (*See annex 3*) for the full survey document. The full questionnaire was agreed to by representatives of TTC and the researcher prior to going into the field.

4.5.3 Observation

One of the main research methodologies in studying small groups in natural settings is observational fieldwork which can either take the form of participant or non-participant observation. Observational fieldwork can be ideal for studying "social worlds". Lindesmith, Strauss and Denzin (1975, p. 439-440) defined "social worlds" as "those groupings of individuals bound together by networks of communication or universes of discourse and who share perspectives on reality".

In this study, both participatory and non-participatory observation was used to enrich data collection. This method was used to study the mobile phone use by the participants of the SMS quiz. This exercise was conducted between July 10-15, 2010 at Mbarara AIC Branch where some of the SMS quiz participants visited to access HCT. The researcher took notes on participant

behaviour with their mobile phones. In direct observation, I was engaged in detailed, descriptive note-taking about the specific, concrete events that I observed.

It should be noted that mobile phone use can be difficult for outsiders to observe because of the intimate nature of the devices. Mobile use can also be multimodal (voice and text), further complicating data collection. The mobility and multitasking that are facilitated with the device pose logistical challenges for data capture as well.

Data capture

Recording is an important issue that must be considered during the planning stage of the research. Sarantakos (1998: 216) posits that recording can take place in a manner most suited to the research topic and with which the researcher is most familiar. I used two methods of recording; summarizing information on a note pad and using audio tape recorder to capture conversations.

Although writing down information is the most common recording method but is limited especially when the information to be recorded is dense. Sarantakos (1998) adds that apart from this, taking notes may shift the attention of the researcher from the scene to the paper causing them to eliminate part of the activities of the group (in cases of observations). He advises that a researcher should write down key words or phrases as a guide and should complete them after observation.

During the field work, audio recording made the data gathering process much easier because writing down was impossible in some of the settings. For example, the focus group discussion involves so many people talking almost at the same interval which makes it difficult to write the feedback; in that case a tape recorder is most appropriate. Without a table or desk to write on, audio recording was the most ideal way of getting accurate information.

Additionally, audio recording came handy in cases of elite-interviewees who granted me very short interviews due to their busy time schedules. In such cases, I concentrated more on getting as much information as possible and focused less on jotting down. This made recording the best way of recording information in such instances.

Tape and audio recording make the process easier, more efficient and provide more accurate and valid recordings. However, there are cases when recording is not possible or respondents object

to it and limit its use. It is important to highlight that permission was sought before audio tape recording was done. At the beginning of every interview session, respondents were given an overview of the research and given an explanation as to why recording was an important part of the study.

4.6 Data analysis

The research analysis focused upon of perceptions reported and the rationales behind the acceptance or rejection of mobile phone based SMS quiz as a tool for HIV and AIDS awareness. A number of analytic techniques were used. First, responses were compared and contrasted together in order to identify thematic categories within the reported perceptions and explanations. Then there was comparison of responses from different participant groups and representing different perspectives.

The findings were analyzed using three strategies of qualitative analysis as stipulated by Bickman et al (1998); categorizing strategies, contextualizing strategies and memos and displays. These methods were generally combined. Contextualizing was also used to understand the relationship between the different elements of the text. Memos and displays in the form of tables and illustrations were also used as valuable analytic techniques to illuminate the relationships in the data and make the key elements and analyses more visible and retrievable.

It is important to note that not all the data gathered from the field could be used. The researcher employed what is termed 'data reduction' where the researcher notes redundancies in the data and 'discards all but the most interesting and compelling statements concerning a particular issue or theme, relevant to the subject of study, Doyle (2004:4).

4.7 Data credibility

Quantitative and experimental researchers generally attempt to design, in advance, controls that will deal with both anticipated and unanticipated threats to validity. Qualitative researchers, on the other hand, rarely have the benefit of formal comparisons, sampling strategies, or statistical manipulations that 'control' for the effect of particular variables and must try to rule out most validity threats after the research has begun, using evidence collected during the research itself (Maxwell, 1998: 91).

The biggest validity issues that a qualitative researcher has to confront are researcher bias and the effect of the researcher on the setting or individuals studied generally known as *reactivity*. Maxwell argues that eliminating the actual influence of the researcher is impossible, and the goal in qualitative research is not to eliminate this influence but to understand it and use it productively (ibid: 92).

In addition, Patton (1990) argues that the reliability and validity of qualitative data depend to a great extent on the methodological skill, sensitivity, and integrity of the researcher. He suggests that systematic data collection procedures, rigorous training, multiple data sources, triangulation, external reviews and other techniques aimed at producing high quality qualitative data that are credible, accurate and true to the phenomenon under study should be employed (ibid: 54).

Maxwell (1998) suggests that a qualitative researcher can use *rich data* (data that are detailed and complete enough that they provide a full and revealing picture of what is going on). In this study, *rich data* was used whereby all the voices involved in the research were put into consideration to illuminate on the SMS quiz project. In this study all the opinions captured during were put into consideration rather than simply those that the researcher deemed useful.

4.8 Limitation of the study

This research noted several limitations; first, since all the participants were recruited by Text to Change meaning that participants in the study were likely to be interested in using text messaging (SMS) to access HIV and AIDS information and therefore have positive opinions. To attempt to address this bias, an open environment was fostered so participants could freely share negative opinions and neutral impressions.

Further, misunderstandings and misinterpretation of the mobile phone technology might have occurred, and this could have led to invalid or speculative responses. Therefore, participants' views may change significantly upon greater awareness of the technology. Nonetheless, it is important to understand the end-users' immediate impressions because they may lead to lasting positions (Rogers, 2003).

Finally, intensive qualitative research is a reflexive process, where the researcher's opinions and experiences may introduce bias to data collection and analysis (Creswell, 2007). To diminish this

effect, interview responses were analyzed for contradictory perspectives, and these are fully represented in this dissertation.

4.9 Chapter summary

This chapter presents the methodological approach used in this study and a justification for the research techniques chosen. The different activities that I was involved in during the field work process are also presented.

During the study, some challenges were faced. Some of these include; Difficulty in access, where some respondents, particularly those in high positions were very difficult to get hold of. A lot of time and money was spent in establishing contact. This also meant that the bulk of these interviews had to be conducted during the last weeks of the field work which was very tiresome. Secondly, some respondents, particularly informants were very poor at time keeping. Some of them granted me appointments during times when they were seriously engaged in official activities, meaning that I had to wait for a long time in order to conduct these interviews.

5 Research findings

5.1 Introduction

This chapter presents the findings from the field study. In the research objectives identified in chapter one, the study sought to examine the potential of mobile phones to deliver HIV and AIDS education through incentive-based SMS quizzes deployed by TTC in the selected area of study. To achieve this, it required examining participants' knowledge of text messaging and their attitudes towards using it for HIV and AIDS educational purposes. The study also sought to explore some of the strengths and challenges of using mobile phone-based SMS for HIV and AIDS education.

The discussion in the following chapter is guided by the Domestication of Media and Technology theory outlined in chapter three. The data was gathered through interviews with different persons notably; officials from TTC, selected participants of the SMS quiz program in Mbarara and key informants from partner organizations namely; Aids Information Centre (AIC), HIPS Project, Health Child and Kawempe Healthcare Initiative. Interviews were also conducted with officials from Uganda Communication Commission (UCC).

This chapter begins with a brief description of the case study (the SMS quiz program) highlighting on the program activities, implementation and outcome. This is followed with a presentation of the perceptions on the use of mobile phones for HIV and AIDS education which includes feedback from the Focus Group Discussions, observation and face-to-face interviews. This is presented under different themes for easy comprehension. A summary of the chapter is then finally presented.

5.2 The Case Study: The HIV and AIDS SMS quiz program

This section presents a description and analysis of the outcome of the Case Study; TTC's HIV and AIDS SMS quiz program which was implemented in Mbarara district, western Uganda. The section highlights on the program objectives, main activities, outcomes, challenges and feedback from respondents.

The case study is a pilot project which was launched in February 2008 with support from The AIDS Information Centre, Zain (former Celtel), The Dutch Foreign Ministry and Merck.

5.2.1 The program stakeholders

The mobile phone-based HIV and AIDS awareness intervention analyzed in this study was a joint project between the Dutch NGO, Text to Change (TTC) and a Ugandan NGO, The AIDS Information Centre (AIC), with sponsorship from Zain, one of the leading telecommunication companies in Uganda. Other partners which offered valuable support include The Dutch Foreign Ministry and Merck.

a) Text to Change (TTC)

TTC is a non-profit organization, founded in 2007 in Amsterdam, the Netherlands. It uses state of the art mobile phone technology to collect and disseminate health information. TTC has been one of the pioneers in using mobile phones for health monitoring and advocacy in Uganda reaching out to the general public at a large scale. TTC works demand driven and sets up complete programs with local and international partners. The aim of TTC is to make life saving knowledge easily available to the general public and especially to community and family level caregivers.

TTC is specialized in interactive and incentive based SMS programs addressing a wide range of health issues such as HIV and AIDS, Malaria and Reproductive Health and Family planning. In the last 3 years TTC has carried out numerous successful SMS programs with various organizations with the aim to increase knowledge and improve the uptake of health services in Africa. TTC's sms programs have a response rate between 20 and 50 % and have shown remarkable figures in uptake of health services (+200%)¹⁷. At present TTC is active in Uganda, Kenya, Tanzania and Namibia.

b) The AIDS Information Centre (AIC)

The Aids Information Centre, a non-government organization, was established in 1990 to provide HIV counselling and testing (HCT) services and information on HIV and AIDS in Uganda. Voluntary counselling and testing is recognized by UNAIDS as an important entry point intervention to effective prevention, care and treatment. AIC provides HIV counselling and

¹⁷ More information can be accessed on the Text to Change webpage: <http://www.texttochange.org/>

testing services in eight regional centres and through the HCT expansion program enabled by the AIC support to health facilities and other organizations in their provision of HIV counselling and testing in Uganda. Closely coupled with this is the provision of accurate information on HIV and AIDS to individual clients as well as to the mass audience through mass media and outreaches to communities. AIC aims at empowering people, even those considered high risk, such as commercial sex workers and refugees, to adopt safe sex practices so as to further reduce the rate of HIV transmission.

c) Zain Uganda

Zain Uganda, previously called Celtel Uganda Limited began offering mobile phone services in Uganda in 1998. The company is owned by Celtel Group, one of the largest mobile telecommunications operators in sub-Saharan Africa, whose parent company— Zain—is the leading telecommunications operator in the Middle East and Africa. An SMS-based multiple choice quiz was administered to 15,000 Zain mobile phone subscribers in the rural region of Mbarara. Free airtime was offered to users to encourage participation in the program; this was determined to be a powerful incentive since users can exchange the airtime with other subscribers as a type of currency¹⁸.

5.2.2 The SMS quiz

The Text to Change (TTC) SMS quiz project was launched on February 14, 2008 as a pioneer project in Uganda with the aim of increasing awareness on HIV and AIDS through information dissemination via mobile phone text messages. The project sought to increase HIV and AIDS awareness with the overall aim of encouraging participants to access HIV Counselling and Testing (HCT) services.

TTC worked in collaboration with local HIV counselling and testing (HCT) service provider, the AIDS Information Centre (AIC). The organizers chose a list of 15,000 Zain subscribers in Mbarara district in Western Uganda and sent them an introductory SMS asking if they would like to participate in a free interactive quiz about HIV, with the incentive of handsets and airtime as rewards for correct answers. A question was sent each week. If the recipient answered correctly, a confirmation SMS was sent; if he or she answered incorrectly, a message with the correct answer

¹⁸ More about this program can be accessed from the report available at the site:
http://www.texttochange.com/mHealth_for_Development_TTC.pdf (accessed on 29/11/10)

was sent. Some of the questions included, "What is the difference between HIV and AIDS?", "How is HIV transmitted?", "Have you ever tested for HIV?" among others. *Annex 1* show the complete questions used in the SMS quiz program. Included in the messages was also the following information: 1) that it was free to answer, 2) that participants would remain anonymous, 3) that prizes could be won if answering, and 4) the location of the AIC branch in Mbarara, where participants were entitled to a free HCT session. The two first questions focused on demographics, i.e. age and gender of the respondent. This was to get a clearer picture of who the respondents were, which would later help in the monitoring and evaluation of knowledge levels on particular topics.

The questions were designed by the counsellors at AIC in Mbarara, and were meant to answer the most frequently asked questions were being asked by people in the counselling rooms.

The questions were mainly to raise awareness on questions concerning HCT; like confidentiality, accuracy, cost and the time it takes to get the HIV test result back. These issues have all been identified in previous studies as barriers that prevent people from seeking out VCT.

The program launch was preceded by a radio talk show on Vision Radio by a team from Mbarara branch to create awareness about the project. According to the organizers, of the 15,000 subscribers contacted, 2,500 responded to each question. At the end of the trial period of questions and answers, participants were encouraged to go for HIV testing.

According to TTC, this strategy is designed to use edutainment and interactive SMS communication to reach out many people to spread the message about HIV and AIDS and make it a subject of discussion. TTC emphasize that the privacy offered by mobile phones is a significant factor contributing to the successful use of this technology for health education.

Upon completion of the quiz program, TTC Director, Bas Hoefman said the SMS quiz increased traffic at AIC counselling and testing facilities: *"We are very happy that the launch has been a huge success in terms of the uptake of VCT services. Therefore, we congratulate our partners at AIC Mbarara for this great achievement. Nevertheless, this program is a pilot and meant as a trial to see if the approach could be successful. The next step is to run the SMS quizzes in the local languages, so that the people in the rural areas, who don't speak English, can also be reached with HI and AIDS sensitization messages."* - Bas Hoefman.

5.2.3 Implementation

Before the SMS messages were sent TTC conducted a community sensitization of the project through radio and outdoor promotional materials like posters and flyers. A mobile truck carrying informative messages was also used to increase awareness of the project.

TTC and Zain, with help from AIC, devised a six-to-eight-week pilot program, which was advertised with the slogan, “Don’t guess the answers, and learn the truth about AIDS.” In order to allure subscribers to respond, potential participants were promised rewards such as handsets and airtime for correct answers¹⁹. Once a subscriber agreed to participate he or she received a text once a week with a new multiple choice question, (refer to annex 1). Those who got the question right automatically received a message offering free HIV counselling and testing and the opportunity to enter a draw to win various prizes, while those who didn’t, received a message explaining the correct answer.

About 2,500 of the 15,000 subscribers contacted responded to each question. At the end of the trial period of questions and answers, many participants were encouraged to go for voluntary counselling and testing (VCT). TTC said that “the response level of our pilot Quiz was on average 15% per question.”²⁰

“Working with one HCT center allowed us to measure the uptake of VCT services as people had to identify themselves via their telephone number. Nevertheless, we are very happy that other Centers also have received numerous clients because of the TTC program. This means that the message has been spread as a result of our quiz program”.-said Bas of Text to Change

Winners of the HIV quizzes were invited to an award ceremony on the April 18, 2008 at AIC Mbarara branch premises, where they received mobile phones. As a means to encourage people to get tested, the program seems to have been as effective as its organizers had hoped.

¹⁹ More about this program can be accessed from the report available at the site: <http://www.texttochange.com/ZAIN-TTC.pdf> (accessed on 29/11/10)

²⁰ The information can be viewed at: <http://www.texttochange.com/projects.html> (accessed on 29/11/10)



Some of the winners of the SMS quiz in Mbarara

According to Robert Natlaka, AIC's representative in Mbarara, requests at their facility rose significantly over the pilot's six-week duration noting that: *"Some 255 [participants] turned up to AIC in Mbarara for testing; some others also went to AIC partners [around] the district. The Mbarara branch of the AIC confirmed that people who came for VCT, did so because of the SMS received."*

Participants of the quiz program were randomly selected and not targeted since the organizers did not have access to the profile of subscribers. The majority of the mobile phone subscribers (over 97%) in Uganda are pre-paid, meaning that the phone companies don't have access to the customers' names, addresses, or any other personal information. SIM cards are sold on the streets by small vendors, and there is no registration procedure upon purchasing a SIM card.

Dr. Raymond Byarubanga, the AIC Executive Director said, "We are very happy to proceed with the Text to Change program as AIC strongly believes in using innovative approaches for HIV education, prevention and scaling up HIV counseling and testing (HCT)."

5.2.4 Outcome

Out of the 15, 000 subscribers reached in Mbarara district and Western Uganda, 2500 were directly involved in the HIV and AIDS SMS quiz. That means that 2500 individuals sent back answers to one or several questions. 183 males and 67 females accessed HCT services at AIC in Mbarara town during the period of the intervention, making a total of 255 people. This was the highest number ever achieved at AIC in Mbarara. TTC explained that this represents approximately 35% increase in the number of clients accessing VCT compared to a regular month. The increase in clinic visit was highly attributed to the SMS quiz campaign.

“I am very happy with the results of this workplace based SMS pilot. SMS has in all its simplicity, once again proven to be an effective complimentary tool to bring across health information and communicate about health services that are available. We are looking forward to expand this initiative to more companies in Uganda and elsewhere,”—Bas Hoefman of Text to Change.

5.3 Perceptions on use of SMS quiz for HIV and AIDS education

This section presents respondents’ views on the potential of TTC’s SMS quiz to deliver HIV and AIDS education. In this section, analysis is also made based on responses from face-to-face interviews, focus group discussions, rapid assessment survey and observation. During the interviews, several themes emerged and used as a platform for making analysis as below;

a) How affordable is the SMS service?

Mobile phones – also known as cellphones – are increasingly considered as more than simply devices that allow people to communicate to each other in an accessible and engaging manner. The mobile phone service in the form of Short Message Services (SMS) has been considered as one of the most successful mobile services in recent years. Currently, SMS is either used for mediating person to- person communication or for accessing mobile end-user services. In terms of access to HIV and AIDS information, the service has been hailed as being affordable by a vast majority.

However, the level of affordability of mobile phone devices was a key concern for many of participants in this research project. Mobile ownership was found to be disproportionate in the area of study with fewer women having access to mobile phones compared to their male counterparts. Further, in some areas where both males and females could afford the cost of mobile phones, they had no or very poor GSM signal coverage. Moreover, the major mobile phone providers including *Zain*- which was the operator of the SMS quiz, had not extended their services to the hard-to-reach parts of the communities at the time of the research.

Concerns about the potential expenses of mobile phone services raised issues regarding HIV and AIDS education inequality. Some respondents believed that individuals who could afford the technology had special access to health information and consequently, the health disparity gap

with the financially needy would continue to grow. In order to avoid this inequity, a participant strongly advocated for socially conscious and equitable development of the technology.

Although the SMS quiz in Mbarara was a free service, it was noted that some participants had no access to the service because they either did not own a mobile phone or because of poor network signals. In response to signal strength an official from text to Change said: *“This program is a pilot and meant as a trial. We are not surprised that occasionally it happened that we had to send a [quiz], question again because there were some details missing. It also happened that some questions were sent twice because of questions cuing in the system, but these were exceptions. In general we delivered most of the 18 questions properly”*.

Concerns were also raised about absence of electricity to charge the mobile phones. A participant, 28 years old said: *“I bought a mobile phone about five years ago but I don’t use it. It is very expensive to buy airtime [talk time], charging is also expensive so I usually listen to the radio. But when I was told about the [quiz], program, I had to join.”*

Another participant added: *“We are not sure about security and privacy [of using mobile phones to send personal information]. Not all devices are compatible with each other. They don’t work all the time: sometimes they break, or the batteries run out, or they can get stolen.”*

Participants thus strongly doubted the mobile phone’s capacity for extensive awareness programs because of limited battery life and spotty network connections. The majority of the people who had ready access to networks and could afford to use the mobile phones to meet their communication needs were typically located in semi-urban communities where there were more income-generating opportunities. These people therefore had a higher level of disposable income. This illustrates the inappropriateness of deploying the mobile phone-based SMS quiz in rural areas.

Some participants believed their mobile phones were not technologically capable of running HIV and AIDS messages. They assumed their phones needed sophisticated features like, more memory, a large display screen, a keyboard, or a camera – in order to use the device for HIV and AIDS awareness purposes. Upgrading their phones with these improvements would incur costs that some participants wished to forgo. Furthermore, without knowing who would pay for these expenses – whether the participants, the health organization, – there was some people hesitance to adopt the technology.

b) It is cheap but is it accessible?

The text messaging feature that makes mobile phones affordable was hardly used by participants owing largely to low literacy capacities and a cultural preference for verbal communication. The number of languages used by these communities further compounded the issue of low literacy.

Feedback from the focus group revealed that the most commonly used language for daily activities is Lunyankole thus mobile phones largely presented opportunities for them to speak in their native languages, whereas text messaging required that they should be literate in English. Majority thus suggested that if the service was voice-based as opposed to text-based, this would overcome the language barrier. This was a huge set back to the suitability of the SMS based Quiz program with a participant, 25 years saying: *“It is very hard to read the messages [SMS quiz text], because it is in English. But the radio programs are [broadcast], in our mother [native], language”*.

A project officer from TTC acknowledged the respondents’ concerns saying language barrier was a key challenge because all the messages were in English; this eliminated the non-English speaking subscribers. As a solution to this challenge, the official said: *“The next step is to run the SMS quizzes in both English and in local languages, so that the people in the rural areas, who don’t speak English, can also be reached with HIV and AIDS sensitization messages. In the end, we want the quiz to be accessible for every Ugandan”*.

Mere ownership of mobile phones without the ability or opportunity to use the SMS option in their own languages makes this technology still largely inaccessible and expensive for the illiterate rural people of Western Uganda.

c) Face-to-face communication preferred?

Mobile phones connect communities and reduce the distance between distant people. In the same way, it closes the gap between health workers and clients. The group of people who participated in the study generally acknowledged the value of faster contacts for health awareness through the use of mobile phones as a result of the shrinkage of time and space brought about by this technology. However, in a community where premium is placed on face-to-face communication, the mobile phone is likely to be rejected. During a focus group discussion, one participant expressed that: *I can read their messages [health experts], all right, but I need to see their face to be comfortable.”*

The substitution of text messaging for the usual face-to-face communication can be disadvantageous for a culture that believes that 'speech is in the face'. This gives precedence to face-to-face communication over the text messaging communication that mobile phones provide. This attitude may pose a potential setback to the suitability of using text messaging to deliver HIV and AIDS education in such communities.

Respondents in the study strongly believe that replacement of face-to-face contacts with the text message quiz would interfere with their routine communication. The concern was that face-to-face communication that serves as a source of personal bond may be adversely ruined by the constant use of mobile phones.

Some participants saw voice communication as the only purpose for mobile phones, so they did not adopt web, text or multimedia functionalities. They purchased phones with the most basic features and were satisfied with their decision. Advanced mobile phone tools were also rejected as a means of reducing expenses.

Other participants found that alternatives for mobile phone use are easily accessible for instance, fixed line phones or Internet accesses are prevalent. One respondent said she was frequently on the Internet at work and at home, so she did not feel comfortable receiving health messages on her phone. Secondly, participants restricted their mobile phone use by selectively disclosing their phone number to close relatives and friends. One respondent said, *"I usually do not give out my [mobile phone]. I have to know who you are and why you are going to be calling or sending me text."*

Mobile phones can be a personal line of communication that users wish to protect. For this reason, participants limited their use of mobile phones to close family members. They might prefer fixed line phones or voice mail to mobile calls and text messages. Some participants said they did not like talking on the phone, with many participants justifying how face-to-face conversations might yield more positive results due to the influence of eye contact. In many of these cases, mobile phone use was reserved for emergency and urgent situations. Consequently, this infrequent use meant participants would sometimes forget their phone and leave it at home. Overall, these restrictions may impose barriers to the acceptance of mobile phone for HIV and AIDS education.

d) **Simple in concept but difficult to operate**

Participants perceived a number of barriers with using text messaging for HIV and AIDS awareness. There were physical limitations – such as small screen sizes and keypads on mobile phones, which participants found difficult to maneuver. There were also motivational barriers. Many participants believed their elderly relatives would be extremely upset if they were asked to use the technology. Attributing their apprehension to a lack of familiarity with mobile phones, respondents felt that immense motivation and training would be necessary for encouraging adoption. Moreover, this sentiment was not exclusive to older adults.

One young participant described the mobile phone as complicated technology saying that, *“It is not easy to write [text on them [mobiles]]. They [mobile phones], are just very complicate. It’s difficult to use because it’s new to many of us.”*

Another participant said, *“I not suitable to be asked because I still think cell phones aren’t even all that great for such things [HIV and AIDS education]. I would be happy using my phone for calling friends and relatives. The only reason that ... I even have a cell phone on me is because I see that everybody else does. I don’t think that it’s surprising that I’m not really looking forward to these devices for my health information.”*

For some people, acquiring the skills for mobile phone use can be difficult. One participant described her parents’ difficulty with using text messaging, and she attributed it to lack of training on how mobile phones operate. In another case, an elderly respondent discussed her difficulty in remembering mobile phone procedures. She always requested her grand-son to read out the text messages for her.

An elderly participant, *“I don’t know what to do ... how to use it [mobile phone text messaging]. I don’t know what to do if I make a mistake. There seems to be a lot of things for me and a lot for me to do – and a lot more than what I’m doing now,”*

Other usability criticisms were about the difficulties in screen navigation. Some respondents found it slow and frustrating to type on the small buttons of a mobile phone keypad. Because of these concerns, some saw the mobile phone as a secondary tool for health information, while the traditional media like radio was their first choice because of its greater reliability and ease-of-access. In light of these usability problems, some respondents intended to wait for improvements in mobile phone design before adopting them for HIV and AIDS awareness purposes.

A participant said: *“While my [mobile phone], screen is slightly larger than my friends’ phones, it’s not so easy to read [the text], many times, I ignore some things [text messages]. If somebody is trying to communicate a lot of information with me [on a mobile phone screen], I may not read all the text.”*

Another participant added that: “I think it is hard to enter information into it now, and people get turned off by that ... it turns me off. I like to send messages but i don’t want to be pressing a button three times to get a letter in.

e) Text messaging, a powerful tool for HIV and AIDS education?

Most of those interviewed reported their willingness to use cell phones to receive HIV and AIDS text messages. A majority expressed their interest in receiving messages about sexually transmitted infections (STIs) on their mobile phones because of the privacy guaranteed by the service. They would like to receive information regarding where to access testing, counseling and treatment. A participant, 27 said: *“With a text message, I don’t fear to speak my mind regarding HIV and AIDS because no one is watching me.....so no one will talk ill about me. I am not ashamed to ask any questions because I am not being seen.”*

A powerful promise of text messages as noted by respondents is that social interactions serve as more of an instant personal contact with someone else, without having to worry about your personal appearance and actual interaction. Many people were pleased with the element of privacy offered by mobile phones at any given time and /or place for individuals to communicate. Participants appreciated that text messages could provide opportunities for less direct communication with health professionals. They also noted that this would greatly save their money and time. Participants gave the above reasons as their basis to adopt the SMS service for HIV and AIDS educational purposes.

Participants explained that speaking with doctors can be intensely embarrassing, so some times they concealed vital information or refrained from questions and discussion in order to avoid embarrassments. A common feeling was *“I wouldn’t bother my physician with some of those questions.”* Many respondents recognized that these behaviors are not constructive. If health questions and feedback could be sent by text messages, they believed that embarrassment might be avoided.

According to Joinson (2001), indirect communication encourages honesty and openness as patients exhibit higher levels of self-disclosure in health discussions mediated by computers. A participant emphasized that electronic written in the form of text messaging was sometimes the

only opportunity she had for contacting her health professional. Overall, many respondents believed SMS could help with communicating difficult health issues by providing opportunities for written communication.

This study observed that mobile phone health services might increase the demand for personalized information delivery. Participants expected health information on mobile phones to be filtered and tailored to the user's needs. Many said they did not like the bulk, non-personalized messages. Respondents hoped personalizing the text messages could help deliver more relevant information.

Participant: People don't really know what [health information] to search for ... There's so much information out there about different kinds of diseases and different ways of diagnosing it. If you could make [tailor health information] to that person's weight, age, habits; [then] it will provide a more effective way of [delivering information] ...

Participant: [Mobile phone health services] lessen the need for relationships and interactions [with health professionals] – the personal aspect of it. You wouldn't develop as personal a relationship with your doctor, which would then instill a sense of trust ... [It] takes out the social-personal medium.

Despite the perceived strengths of mobile phones, many participants explained that much of their text messages relate to friendship maintenance, romantic, social functions, and/or boredom and loneliness. Similarly, a study on a group of undergraduates showed that only about one third of the text messages that were being sent were actually functional/practical information; the rest was a combination of filler messages (Reid & Reid 2004).

In line with above, many respondents said for some time they would ignore or automatically delete messages sent by operators. They mainly paid attention to messages from friends, families and partners. A participant, 21, said: *"If I received an SMS from the network (operator) I would not bother reading because it is always the 'same-same' information. But I am excited to read text from my fiancée or siblings."*

Another participant added that: *"I can see people getting annoyed with the volume of [health-related] text messages depending on how many are sent out or the content of [the] text messages."*

f) SMS prone to information overload?

Participants believed if large volumes of health information were delivered to mobile phones, there were concerns that this would be difficult to manage and organize. If there was too much information to process, they worried that this could lead to misunderstandings and health care errors. By comparison, a conversation during a face-to-face with a health worker was perceived as more helpful.

Participants believed that HIV and AIDS education requires rich interaction between an health worker and a client. In addition to what the patient describes, respondents believed it was important for health professionals to consider non-verbal cues – such as the tone of voice, body language, and other mannerisms – to fully understand clients and their condition. However, mobile phone health services were seen to potentially divide health care into smaller automated tasks, which may not address the complex emotional issues such as trust and the unspoken needs of the clients.

Participant: [With mobile phone health services], I'm afraid [health care professionals] won't ... understand me and the way I respond as a human being, so that they [can't] put that [information] in the data set of making a [health care] decision."

g) Mobile phones and the social lifestyle

The mobile phone is the way in which individuals interact with each other. With the development of the technology, individuals are able to remain in close and instantaneous contact with members of their social network regardless of where they are in the world. In addition to keeping up with social relationships, individuals have also been able to increase productivity with their work because they can be hundreds of miles away from the office, and still have instant access to their e-mail, documents and contacts wherever they are.

h) Cellphone attachment

Mobile phones are becoming increasingly popular among the general population. Many people rely on their phones on a *daily* basis to stay in contact with other individuals in their social networks. Many participants explained that their phones have become part of their lives with a participant, 14 years old saying: *"I just can't imagine myself without a cell phone now. When I don't have my phones I always feel like I'm missing something."*

A participant aged 21 years said: *“I move with my cellphone everywhere, I can’t do without it.... I am always expecting a text message or a call from someone. . The phone is just part of me.*

Respondents explained that they experience a strong attachment to their mobile phones with many saying, “I always carry it everywhere.” They suggested some reasons that can explain this attachment such as leisure, boredom among others.

An important aspect of the phone which many said contributed to this attachment is the SMS function.

A rapid assessment of the demographics of cellphone usage among the participants indicates that SMS/Text messaging has become more popular among younger generations in comparison with older generations. In addition, individuals claim to see text messaging as a comfortable, easy and effective means of communication for younger people (Thompson and Cupples 2008).

The focus group helped identify following some benefits of text messaging. First, mobile phones allow users to send text message to their friends – another way of facilitating social interaction and network with friends, secondly, cell phones are an excellent device for chatting with friends irrespective of proximity.

Participants revealed that many people still rely on the traditional media as their source of information on HIV and AIDS and related issues. Majority said the radio is their main source of information with one respondent saying; *“I still prefer to listen to the radio...because I don’t have to read or write anything. I just sit down and listen to what the peer educators are saying”.*

Today, the radio is probably still the dominant communication medium in many parts of the world because it is inexpensive and available to citizens at all levels of society, including the illiterate. Due to its pervasiveness, the radio is well-placed to reach out and give voice to marginalized groups.

In Uganda, the radio is one of the most effective means of communication today, perhaps the only affordable form of mass media communication that has reach across the remotest areas of the country. Being largely an agricultural country, radio fits with the lifestyle of many people in Uganda. It is a popular media channel because it does not require electricity, and because people can listen to the radio while they work, walk or drive. By broadcasting in local languages is very

crucial because it addresses the information, education and entertainment requirements of its localities and audiences.

i) Incentive-based program, effective strategy?

Participants of the focus group explained that the HIV and AIDS information on radio stations are monotonous, non-interactive and non-engaging. In light of this, they are always put away. Meanwhile, the SMS quiz was seen as motivational because of the reward systems deployed by Text to Change with *a quiz participant saying,*

“I was very glad to win free talk time minutes and get a chance to test for my HIV status free of charge because I answered a quiz correctly. I told my friends about it and they were encouraged to also participate.”

5.4 Chapter summary

This qualitative study suggested that mobile phone-based quizzes may be useful and culturally-relevant as a way to support HIV and AIDS education in selected area of study. Participants showed enthusiasm for the potential impact of mobile phones interventions using SMS texting as a way to deliver behavioural messages with many participants expressing interest in participating in such interventions.

Some of the advantages of cell-phone delivered education support include the fact that in many resource-constrained settings, cell phone communication infrastructures already exist, a rapidly growing mobile user community and a relatively cheaper option of real time communication.

6 Concluding discussion and recommendations

6.1 Introduction

This chapter consists of a summary of the study, discussion of the major findings, implication for practice, recommendations for further research and conclusions.

The chapter begins with a summary of the purpose of the study and is followed by the major findings related to the use of SMS quiz for HIV and AIDS education. Conclusions from this study are discussed in relation to research questions, key findings and the theoretical framework. A summary of the findings is then presented. Finally, implications for research, practice and theory are discussed. Some key challenges to HIV and AIDS education in Uganda are presented and lastly, some recommendations are made.

The purpose of this study was to examine how Text to Change (TTC), a Dutch non-governmental organization (NGO) deployed a bulk short message service (SMS) quizzes for health education designed to communicate knowledge about HIV and AIDS and encourage subscribers to volunteer for HIV testing in Mbarara District, western Uganda.

To achieve this, the following research questions were examined;

RQ1: How are text messages being used by TTC to create HIV and AIDS awareness among users?

- a) What are the milestones?
- b) What are the challenges?

RQ2: To what extent is mobile phone based SMS quiz program appropriate channel for delivering HIV and AIDS education among users?

RQ3. a) To what extent do the project participants who own a mobile phone use the medium for accessing HIV and AIDS information?

b) To what extent do the project participants who own a mobile phone use the text messaging (SMS) for HIV and AIDS education-related purposes?

RQ4. To what extent is the mobile phone used for HIV and AIDS education in relation to other communication channels?

RQ5. To what extent is the SMS use for HIV and AIDS education determined by age?

To answer the above questions, qualitative interviews were conducted with different categories of informants consisting of selected SMS quiz participants, project implementers, sponsors, partners and other stakeholders. Face-to-face interviews were conducted with 10 respondents. A focus group consisting of 10 respondents was also conducted. The same group also wrote comments to close-ended questions assessing their knowledge, attitudes and perception on the use of mobile phones to access HIV and AIDS knowledge with a view to improve their awareness about the disease.

Drawing from findings from the TTC mobile phone-based project captured in chapter five, text messaging in the form of the SMS quizzes hold a strong potential to deliver effective HIV and AIDS education to target audiences. During the study, several issues were raised by respondents concerning the level of affordability, privacy, cultural relevance, ease-of-use and accessibility of the service. Other issues of concern were technological competence, illiteracy, gender inequalities among others. These concerns and many others are discussed in the following paragraphs to illuminate on the efficacy of using mobile phone-based SMS quizzes for HIV and AIDS education in the area of study.

Regarding the main sources of HIV and AIDS information preferred by the majority participants, the study revealed that while mobile phones may provide a relatively cheaper, fast and convenient way to deliver HIV and AIDS awareness messages through the SMS service, many people still preferred to rely on the traditional media especially radio to obtain information on various health issues including HIV and AIDS. Today, the radio is probably still the dominant communication medium in many parts of the world because it is inexpensive, available to citizens at all levels of society, including those with limited education, and due to its pervasiveness, is well-placed to reach out and give voice to marginalized groups. Moreover, the radio fits in people's daily lives and it does not require electricity.

In Uganda, the radio is one of the most effective means of communication today, perhaps the only affordable form of mass media communication that has reach across the remotest areas of the country. Being largely an agricultural country, radio fits with the lifestyle of many people in Uganda. It is a popular media channel because it does not require electricity, and because people can listen to the radio while they work, walk or drive. Further, by broadcasting in local languages, radio goes a long way in addressing the information, education and entertainment requirements of its localities and audiences. The above feeling was common among many respondents who

despite the fact that they appreciated the SMS quiz program still underscored the importance of radio for accessing vital information on health, politics and other daily issues.

In a pilot survey to determine the role of Information in Uganda's Reduction of HIV and AIDS, Albright & Kawooya (2005) note that while radio is the main source of general information on AIDS in Uganda, the main impact on behavioural change has been from personal sources and through informal channels of communication. The HIV and AIDS communication strategy in Uganda has greatly incorporated the use of radio stations in the promotion of HIV and AIDS messages. This is because many people have radios in Uganda although this would by no means reach everyone not least due to the many languages spoken in Uganda.

In another related study, Low-Beer & Stoneburner (2003:13) revealed that personal channels of information are the main source for communicating information about HIV and AIDS in both urban and rural areas of Uganda. They further emphasize that "AIDS issues in Uganda were rooted in discussions in social networks rather than just received from public health and media messages, to which there is wide spread skepticism."

Mass media has been instrumental in promoting AIDS control and prevention in Uganda, according to UNAIDS Report on "The media and HIV and AIDS, (2001). Further, Piotrow et al., (1997) explain that this is because the use of multiple media types is expected to reach a larger audience and therefore helps reinforce messages. However, Singhal & Rogers (2003:201) argue that, while mass media communication can create awareness of HIV and AIDS, interpersonal communication with peers is essential to change risk behaviours. The UNAIDS Communication Framework for HIV (1999) affirms the importance of combining both mass media and interpersonal communication to allow for addressing diverse individual and group concerns while honoring the delicate, private nature of human sexuality.

Examining the role gender difference plays in access to HIV and AIDS information, the study revealed that sources of information on HIV and AIDS for many participants differ by gender. In Uganda, the most used source of HIV and AIDS information for men is radio and for women it is friends and family members.²¹ For both men and women, radio, friends, family members and health practitioners are among the top most popular sources. But for most of the mass media

²¹ Rachel Marcus : Gender and HIV/AIDS in Sub-Saharan Africa: the cases of Uganda and Malawi Report prepared for Centre for Development Studies, University College Swansea
available at: <http://www.bridge.ids.ac.uk/Reports/re13c.pdf> (accessed March 10, 2011)

sources, including radio, TV, newspapers/magazines, and the internet, they were used more intensively by men. Men were also more likely than women to get HIV and AIDS information from colleagues at work, while women were more likely to use elders in the community as a source of HIV and AIDS information.

Similarly, a recent survey on access to ICTs in Uganda shows that although mobile phones are among the most accessible ICT devices, there is a huge gender gap with men being 10 percentage points more likely to have access to a mobile phone than women²². Feedback from the rapid assessment on the knowledge, attitudes and perceptions of participants concerning their reasons to adopt mobile phones for health education purposes also revealed more males willing to use their mobile phones for HIV and AIDS awareness compared to females. Moreover, while observing some of the participants who visited the Mbarara AIDS Information Centre to seek for various health services, it could be seen that more males were actively engaged with their mobile phones. It should however be noted that mobile phone use can be difficult for outsiders to observe because of the intimate nature of the devices. Mobile use can also be multimodal (voice and text), further complicating data collection. The mobility and multitasking that are facilitated with the device pose challenges for data capture as well.

The ‘rural-urban’ difference was also cited as an important factor affecting adoption of mobile phones for HIV and AIDS awareness. This study notes that whereas there is a significant mobile penetration and an expanding number of people are acquiring mobile phones throughout Uganda, rural residents were significantly more likely to use word-of-mouth information sources including friends, family members, traditional healers, or elders in the community. This could pose a serious challenge to the use of SMS quizzes for HIV and AIDS awareness in such communities. The Majority of the SMS quiz participants also reported sharing mobile phones further deepening challenges of such a program.

Additionally, it was discovered that traditional media outlets may be more effective at reaching urban rather than rural residents. Providing health information to family members and influential community members are thus important for information dissemination to women and rural residents. Through the focus group session, it was revealed that for urban dwellers, the three most-used sources of HIV and AIDS information are; radio, TV, and health workers, while rural

²² More information is available on the following site: <http://www.audiencescapes.org/country-profiles/uganda/communication-habits-demographic-group/gender/gender-229> (accessed April 1, 2011)

people turn most to friends, family members, radio, and health workers. Most general media sources were more likely to be used more intensively by urban rather than rural dwellers.

The difference in education was also cited by participants as a major factor affecting the acceptability of mobile phone-based SMS quiz. The text messaging feature that makes mobile phones affordable was hardly used by participants owing largely to low literacy capacities and a cultural preference for verbal communication. The number of languages used by these communities further compounded the issue of low literacy. Majority of the participants reported only being competent in their native language (Lunyankole) with very few saying they could read and write in English. The limited use of SMS to English is a likely consequence of high illiteracy rates in the rural population of this study. Male and female SMS rates may also reflect the differences in literacy levels.

Since the SMS quiz required that participants should be literate in English, majority thus suggested that if the service was voice-based as opposed to text-based, the language barrier would be overcome. The limitedness of the quiz to English only was seen by participants as a setback to the suitability of the SMS based quiz program to the groups with low education. These results further suggest that applications of mobile phones for HIV and AIDS educational purposes should emphasize voice-based communication and user interfaces that can be used by those with low literacy.

Indeed, those using SMS were found to have higher levels of schooling. Majority of these were males who had attended formal schooling with very few females having attended formal school. It should be noted that women in Uganda are at an educational disadvantage compared to men. Women's comparative lack of schooling limits their opportunities and constrains their choices. Yet education is crucial to gaining the knowledge, skills, and confidence that women need to improve their status and health. Owing to this, fewer women were willing to adopt the mobile phone-based SMS quizzes for their health information sources.

In relation to the above, face-to-face communication was viewed as having more power over the text messaging communication that mobile phones provide. The respondents strongly believe that face-to-face communication that serves as a source of personal bond may be adversely ruined by the constant use of mobile phones. For those who preferred to use their mobile phones, they saw voice communication as the only purpose for mobile phones, so they did not adopt text, and other multimedia functionalities. They purchased the phone with the most basic

features and were satisfied with their decision. Advanced mobile phone tools were also rejected as a means of reducing expenses.

A discussion on the level of affordability of mobile devices revealed mixed results. A rapid and increasing mobile penetration in Uganda and many rural parts of the country including the area of study are among the key promises of the success of the mobile phone-based health programs. Further, the relatively lower cost of tariffs, perceived ease-of-use is also cited as the key strengths of the technology. However, interviews with the respondents revealed several challenges. First, mobile ownership was found to be disproportionate in the area of study with fewer women having access to mobile phones compared to their male counterparts. This is attributed to the role of the woman in African societies where the 'man' is often perceived as having a superior role. In such societies, most of the family income is managed by the 'man' thus putting them at a better position to afford the mobile phone expense. Further, very poor GSM signal coverage and absence of electricity to frequently charge the mobile phones makes it even more impossible for the end-users to reliably use their devices. Participants thus strongly doubted the mobile phone's capacity for extensive HIV and AIDS awareness programs because of limited battery life and spotty network connections.

Concerning the privacy that the mobile phone provides, participants acknowledged text messages may allow for an element of privacy at any given time and /or place for individuals to communicate. Participants appreciated that text messages could provide opportunities for less direct communication with health professionals. They argued that speaking with health workers directly can be intensely embarrassing, so participants often concealed vital information to their doctors or refrained from questions and discussion in order to avoid embarrassments. Many believed that if health questions and feedback could be sent by text messages, they believed that embarrassment might be avoided.

However, there were growing concerns of the negative impact of the privacy guaranteed by the text messages. Participants argued that the privacy would cut the bond face-to-face or voice adds to the HIV and AIDS awareness process. To many, by being able to talk to health workers face-to-face, they are able to build trust and personal connections that is necessary for psychological benefits. To many, text messages sent in the form of bulk quizzes without any personal attachment may not be so effective in motivating them to take action (for instance go for HIV

and AIDS counseling and testing). Some of these challenges led to participants suggesting they are less likely to adopt the service.

Regarding the incentive-based approach, this study revealed that a huge turn up was also attributed to the rewards associated with participation in the quiz. Participants showed a lot of enthusiasm in the quiz because they expected to receive rewards in the form of air time (talk time) minutes, free access to HCT, mobile phones and many others. The primary goal of an incentive-based program is to motivate participants in some particular way by offering them some form of reward.

6.2 Summary

This study attempted to answer the research questions presented in chapter one. Specifically, the paper sought to assess the potential of mobile phones to deliver HIV and AIDS education through incentive-based SMS quizzes. In order to achieve this, the study examined how TTC used the SMS quiz to create HIV and AIDS awareness in Mbarara District, Western Uganda. Several factors including respondents' perception, attitudes and knowledge on the SMS technology were also examined.

Overall, mobile communication offers an effective means of bringing HIV and AIDS information to citizens through the SMS quizzes. With low-cost handsets and the penetration of mobile phone networks countrywide, many citizens who never had regular access to a fixed-line telephone now use mobile devices as daily tools for communication. This offers a new platform for delivering HIV and AIDS education to those groups.

Text messaging service is available on almost every model of mobile phone, the cost is relatively low, its use is widespread, it does not require great technological expertise, and it is widely applicable to a variety of health behaviours and conditions.

Text messaging offers an efficient, and scalable method of providing outreach services for a wide array of health issues including HIV and AIDS. This study revealed that many users already own mobile phones, and the cost of an individual SMS is very low (somewhere between US\$.03 and US\$.05 in Uganda at the time of this work). Additionally, owing to the fact that SMS is

considerably less expensive than standard voice communication, many Ugandan mobile phone users are already familiar with SMS.

Text message campaigns are also viewed as very simple in concept increasing their suitability. It can be set up either as one-way alerts or interactive tools used for health-related education and communication. For example, a citizen may sign up to take a survey, delivered via SMS message, quizzing them on their knowledge about HIV and AIDS and the location of the nearest testing center. Depending upon their responses, information regarding where and how to receive a free test would be transmitted. In education and awareness applications, SMS messages are sent directly to users' phones to offer information about testing and treatment methods, availability of health services, and disease management.

Text messaging also has the advantage of being asynchronous because it can be accessed at any time that is personally convenient. Furthermore, even if a phone has been turned off, messages will be delivered when the phone is turned back on. Additionally, text messaging is an innovation for which utility remains even in resource-poor settings in which people may not have access to expensive technology. Text messaging may therefore be suitable for HIV and AIDS educational interventions because it allows for in-the-moment, personally tailored health communication and reinforcement.

However, while SMS serves could be used as a powerful means of HIV and AIDS education, it would be best used in conjunction with existing channels of communication, especially the traditional ones in order to increase the uptake as well as the functionality of the approach.

Secondly, despite the proliferation of low-cost handsets, priced at US\$20 in some low and middle-income countries including Uganda, the initial cash outlay for buying a handset is the most commonly cited barrier to owning a mobile phone by many especially women. Even those who borrow phones and have relatively high incomes cite the cost of handsets as the main barrier to mobile phone ownership. The cost of a mobile phone service is also an obstacle to ownership.

This study research supports the opinion of Mulama (2007: 5) who observed that 'the benefits of ICTs are largely restricted to towns and cities, as most rural areas lack the infrastructure, equipment and skills needed for communities to take full advantage of these technologies'. The phones raised expectations in terms of meeting needs, but lack of affordable access made the realization of these expectations very difficult.

The program organizers stress that scaling up of SMS quizzes would be more feasible if mobile phone networks could provide discounted (or free) SMS for such a programs.

Additionally, marginalization of certain populations, such as those that are illiterate was cited as a setback to the adoption of text-based quizzes for HIV and AIDS education. However, these limitations may be reduced as mobile technology advances. For example, innovations exist that provide voice response systems and pictures instead of text for those with limited literacy.

Language issues have posed challenges; text messages are limited to 160 characters, and incorporating a language like Lunyankole for SMS requires on average 20% more characters than English. In addition, there are no standard SMS abbreviations in that language, and there are often no accepted terms to describe medical conditions, sexual practices, and other issues relevant to HIV. To get around the character limitation, the translated SMSs would use some English words and acronyms (e.g. "ARVs") and abbreviations (largely: the removal of vowels in certain words).

Interventions delivered via mobile phones can be interrupted if the device is stolen or lost. Further, the tariff system of the mobile phone network is highly exploitative. Owing to poor signal coverage in some areas, users can waste precious money trying to get connected. They get charged even when they do not succeed in getting connected.

Poor quality of mobile phone services sometimes makes their use frustrating. On occasion the service providers may offer no service at all, or very poor reception for days. During periods of poor service (poor GSM signal reception leading to low voice quality) the units on the call cards are still debited, making it a double loss for the user.

Although mobile phones can be used for HIV and AIDS awareness and education, users still prefer face-to-face communication owing to many cultural factors.

The SMS feature that makes mobile phone use affordable was hardly used by the research participants, owing largely to low literacy capacities.

This study showed that mere ownership of mobile phones without the ability or opportunity to make use of an affordable technique such as SMS keeps this technology largely inaccessible and overly expensive for the rural people in Western Uganda thus affecting their ability to adopt the service for HIV and AIDS education.

The mobile phone therefore presents a mixed bag of positive and negative values and impacts. It is clearly not a solution for all communication needs, although it has become an avenue to delivering real time HIV and AIDS information to many users.

6.3 Challenges to HIV and AIDS education in Uganda

This study identified some challenges to effective HIV and AIDS education in Uganda. Some of these challenges have been identified and discussed in the concluding chapter of this study. The following are among the top challenges;

There is limited capacity (human, financial and structural) at an organizational level to promote knowledge sharing within communities. In addition, there is a lack of appropriate fora for sharing knowledge on HIV and AIDS. There is also a shortage of researched information about the various categories of information users, their specific HIV and AIDS information needs and desired delivery mechanisms.

Low literacy levels and poor information culture in many communities in Uganda has made it difficult to implement health related education programs. Limited information literacy increases demands for more information processing to add value to information and services, and to promote information awareness, accessibility and usability. Unfortunately, many NGOs and health practitioners lack the financial and technical capacity and initiative for information management.

Further, there is fragmentation of information management efforts that creates the potential for duplication of effort and wastage of scarce resources.

Limited capacity at local levels constrains information dissemination efforts to communities, as well as inadequate structural and physical information delivery systems at all levels that could be exploited for information access and sharing. Consequently, many potential users are not aware of the existence of the required information and/or sources of such information and the appropriate channels for access.

Inadequate funding of NGOs by governments often make it difficult for them to harness ICTs effectively for the provision of HIV/AIDS information.

Finally, HIV and AIDS information overload – the availability of a huge amount of unorganized information on AIDS is creating problems for target audiences to access and manage these materials.

6.4 Implications for research

This study notes several methodological concerns that can be useful for further research. While “case studies” and “pilots” are many, little research in the way of replicable study design with adequate sample sizes on the use of mobile phones for health education was found. Numerous studies described system implementations, but few showed improved awareness outcomes and workflow efficiencies. Thus, further research that examines the impact of mobile devices on behaviour and outcomes, rather than assessing feasibility, is needed.

The position of this study is that accessibility and affordability of a service, such as the mobile phone based SMS technology is not enough to conclude its efficacy to deliver effective outcomes. For novelty to be achieved, further research is needed to link the connection between access of the information and behaviour outcomes from such an intervention. For instance examining whether delivering SMS quizzes directly encourages participants to seek better health behaviours and access HCT.

Further, because of the relative newness of text messaging as a method of delivery for HIV and AIDS awareness, there is a paucity of data and the existing literature on the efficacy of SMS for HIV and AIDS education are quite heterogeneous. A review of literature notes that most of the studies on this subject are still in the exploratory stages, and this technology is being adopted rapidly; so, much information exists outside of the traditional scientific literature (newspapers, blogs, private industry reports, among others). It is imperative to bridge this gap between practice and scientific knowledge. Given the immature state of the field, additional information on efficacy (e.g. message frequency, message content) may be gained from further research.

In summary, future research still needs to be conducted on the potential of SMS quizzes to effectively deliver HIV and AIDS education. Something that should be examined is whether SMS quizzes influence the users to take action. New studies should explore how the access and use of

cell phones varies through different socio-economic classes. This gap between the literature and field practices can lead to mixed opportunities for learning about and improving text messaging as a new tool for HIV and AIDS education.

6.5 Implications for practice

Mobile phone- based SMS quizzes hold a huge promise for delivering effective HIV and AIDS education. Participants showed enthusiasm for the potential impact of cell phones interventions using SMS as a way to deliver behavioural messages with many participants expressing interest in participating in such an intervention. This could increase the demands on mHealth in a number of ways. First, many participants were interested in the services and wanted to learn more, so there is a need for informing the target populations about the technology. Health professionals may respond by cultivating eHealth literacy. Health educators could teach these skills for optimal health technology experiences – which include literacy, numeracy, and proficiencies in media, information, computers, science, and health care²³.

While participants liked the option of mobile phone SMS quizzes as a channel of HIV and AIDS education, they also wanted to retain face-to-face health interactions. They were not interested with the technology replacing traditional information channels – rather they wanted it to complement existing practices and for there to be a choice between technological and personal approaches.

This study however reveals that there were no clear differences between in intervention outcomes delivered by the SMS quiz and the existing HIV and AIDS awareness mechanisms. Moreover, the respondents still preferred the traditional channels. Organizers of the SMS quiz note that in addition to providing the HIV and AIDS information to the target audience in a relatively cheaper, convenient, private and interactive manner, another issue that should be explored is whether the SMS quizzes drive recipients take action such as to seek voluntary counseling and testing.

The results in this study will be important to identify gaps and issues in the literature for investigators as well as best practices to guide practitioners in the field. The results of this

²³ Norman CD, Skinner HA. eHealth Literacy: Essential Skills for Consumer Health in a Networked World. *J Med Internet Res* 2006 16;8(2):e9

research have both theoretical and practical implications for the future research. Limitations of the study can be addressed and solved in the consecutive studies. In summary, mobile phone text messaging services in the form of quizzes are a promising technology that health consumers are interested in adopting.

6.6 Implications for theory

In this study domestication of technology theory is considered a useful analytical framework for describing and understanding mobile phone adoption for HIV and AIDS education. Given the lack of theoretical basis in recent user experience research, the domestication concept provided the foundation that mhealth researchers or practitioners can use to address user experiences of their target populations. The analysis in this study may thus lead to broad theoretical and practical implications for using text message quizzes for HIV and AIDS education.

Although the domestication of technology theory originated in the social sciences to investigate social consequences of technology use, this study reasons that the domestication concept along with the four dimensions (*appropriation*, *objectification*, *incorporation* and *conversion*) provides a useful theoretical lens to address user experiences as it broadens the concept of mhealth ranging from technology adoption and functional use to detailed user interface design aspects such as usability problems and the learning process.

In contributing to the theory, the researcher identified a number of themes across the Four dimensions of domestication and some of them are summarized briefly below;

Regarding *appropriation* of mobile technology, participants provided similar reasons for buying a mobile phone: to be accessible to family members or close friends and to gain ‘peace of mind’ while being outside. Participants used a home phone (a landline phone) as the primary communication tool for various purposes such as making an appointment for social activities and getting information from others. Conversely, the mobile phone was a secondary means to communicate with family members or close friends when they were away from home. All participants carried their phone for safety reasons. In particular, a health-related emergency situation was the top concern. However, participants expressed that they lacked information resources about mobile handsets and services to choose proper one for their needs. Most of them reported that they had to rely on a sales person’s recommendation when purchasing a

phone. However, recommendations were often made based on a business purpose and not on users' needs.

For *Incorporation* revealed a number of faulty product designs that did not reflect older adults' perceptual and cognitive aging: The most common problems were related to visual abilities. Although participants did not have severe visual impairments, they experienced difficulty in reading the screen and labels on buttons, and the perceptual barriers prevented even technology experts from using various features such as text messaging.

Further, those with limited experience with mobile phones reported that they could not make use of contemporary instructional manuals properly due to difficulties in following and understanding the instructions. The use of other media, such text messaging, was suggested as an alternative form of the instructional manual.

Overall, the domestication theory could be developed by addressing the underlying activities in the 'perceptions to intentions to technology adoption' pathway and by focusing on the unique context of mobile phone usage.

6.7 Recommendations

Basing on the research findings and analysis, this study has established some recommendations as presented below; First, this study suggests that text messaging should not be considered a stand-alone model for delivering HIV and AIDS education but rather as a tool by which several awareness techniques can be administered. The findings from this study clearly point out that the application of SMS quizzes for HIV and AIDS education is still in infant stages, thus in order to achieve effective and measurable results, it is necessary to implement such programs alongside the existing pretested mechanisms.

Some methodological gaps identified in this study include lack of rigor in program design with regard to statistical power to detect a significant difference from other interventions. Future studies should ensure rigorous methods and sufficient power in order to contribute to the existing body of literature seeking to determine what combinations of text message factors produce the best results. Additionally, more information is needed on the long-term effects of text message interventions.

Text messaging is a tool that has value to both researchers and practitioners, and use of these technologies may facilitate more active collaboration between research and practice. Given the positive results so far, and the increasing uptake of mobile technologies, text messaging may improve existing practices and interventions. Text messaging may be an important tool to reduce the global burden on health care by providing more effective HIV and AIDS prevention and management support.

The key recommendation in this research is to provide training for targeted HIV and AIDS educational programs on how to send and receive SMS, in their preferred languages, keeping the messages as simple as possible. This training would aim at empowering participants with low literacy abilities, so that they can begin to use SMS to effectively access HIV and AIDS information. However, training people to send text messages using this technology could be challenging because many people in rural areas have limited exposure to technology and some do not even own or use mobile phones.

The potential of SMS may be particularly significant among population groups most likely to use mobile telephones as their primary means of communication. The highest level of mobile telephone use is among adolescents, younger adults and more educated young adults.

Further, given the differences in the use of sources for HIV and AIDS information, health development organizations should consider tailoring communication strategies for reaching different populations.

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Annexes

Annex 1: The SMS-based quiz

1. What is HIV?

- A. a virus.
- B. a bacillus.
- C. a parasite.

Answer A: HIV stands for: human immunodeficiency virus.

2. At which age is HIV AND AIDS most common in Africa?

- A. 0-14 years.
- B. 15-24 years.
- C. 24-35 years.

Answer B: age 15-24 years.

3. HIV is NOT present in:

- A. Semen.
- B. Sweat.
- C. Blood.

Answer B: HIV is not present in sweat.

4. What are the symptoms of an HIV infection?

- A. No specific symptoms.
- B. A rash and a fever.
- C. Feeling very tired.

Answer A: The only way to tell if you have HIV is to take an HIV test.

5. Which part of the body does HIV attack?

- A. None.
- B. The digestive system.
- C. The immune system.

Answer C: It attacks the immune system.

6. Why is it important to know your HIV status?

- A. If positive, you can get medicines.
- B. If positive you can get a vaccine.
- C. If negative you can have free sex.

Answer A: You can get treatment.

7. What does VCT stand for?

- A. Voluntary Care and Treatment.
- B. Virus Counselling and Treatment.
- C. Voluntary Counselling and Testing.

Answer C: Voluntary Counselling and Testing.

8. An HIV test:

- A. Predicts how fast you will get AIDS.
- B. Measures the number of viruses in your blood.
- C. Detects antibodies against the virus.

Answer C: It detects antibodies.

9. What does an HIV test involve?

- A. A rectal examination.
- B. A blood test.
- C. A urine test.

Answer B: It simply involves taking a blood sample.

10. If you took a risk of getting HIV, how long should you wait to get tested?

- A. 2-3 weeks.
- B. 6-8 weeks.
- C. 3 months.

Answer A: It takes up to 2-3 weeks for antibodies to develop.

11. Is the HIV test accurate?

- A. Yes.
- B. No.

Answer A: Yes, the test is very accurate.

12. What kind of treatment works against developing AIDS?

- A. A combination of 2 different drugs.
- B. A combination of 3 different drugs.
- C. Special herbal extracts.

Answer B: The only correct therapy is a combination of 3 different drugs.

13. Where can I go for a confidential HIV test?

- A. Your doctor or several health clinics.
- B. Any AIDS Information Centre (AIC).
- C. Both answers are right.

Answer C: HIV testing is possible at any AIC or doctor.

14. How long does it take to know your HIV result at AIC?

- A. 1 week.
- B. 2 days.
- C. 30 minutes.

Answer C: AIC performs the test in less than 30 minutes.

15. Where is the nearest AIC?

- A. Only in Kampala.
- B. Within 50 miles from me.
- C. Within 5 miles from me.

Answer C: Mbarara center can be found at Plot 11 Ruhara Road.

16. Will other people know my results?

- A. Yes, your partner and family will be informed.
- B. No, everything remains confidential.

Answer B: Nobody will know your result if you don't want it.

17. What if my HIV test is positive?

- A. Bad luck, there's nothing you can do.
- B. AIC will provide support and refer you to the right medical people.

Answer B: AIC will offer counselling.

18. How much does a HIV test cost at AIC?

- A. 50,000 shilling.
- B. 10,000 shilling.
- C. Free of charge.

Answer C: Free of charge if you participate in the quiz.

Annex 2: Guide for interviews with TTC Staff and project partners

The researcher is conducting a study on mobile phones for HIV and AIDS prevention and care. We kindly request you to spare a few moments to respond to these questions. The researcher is fully aware of ethical concerns with respect to your responses, thus will ensure that your feedback is kept confidential. Thank you for your time.

Name...Organization:.....Designation/Position.....

The researcher is aware that Text to Change and its partners are using state of the art mobile phone technology to collect and disseminate information on health issues.

Q 1. Why mobile phones and particularly SMS?

Q.2 What is your experience with implementing an SMS campaign or project?

a) Any success stories?

b) What key challenges?

Q.3 Do you consider an SMS campaign/or project a viable tool for behaviour change among users?

a) Have you recorded any behaviour change successes with an SMS project or campaign?

b) Are you aware of any scientific evidences or studies? If yes specify

Q.4 What do you think about the ICT gaps in Uganda, do you think it's a big challenge to mobile phone or sms project? Specify reasons.

Q.5 What do you think is the key promise for mobile phones in HIV AND AIDS service delivery in Uganda today?

a) What specific benefits for HIV and AIDS awareness and education initiatives?

b) What challenges?

Q.6 Can you provide any other insights and or comments regarding the potential of sms for HIV and AIDS prevention and care?

Annex 3: KAP survey questions for focus groups

Age: _____ Date: _____ Gender: Male ☐ Female ☐

1. How often do you use your mobile phone to send a text message?

Once a week ☐ Several times a week ☐ Everyday ☐

2. On average, how long do you spend on your mobile phone in a day?

Half an hour ☐ an hour ☐ 1-3 hours ☐ More than 3 hours ☐

3. On average, how many text messages do you send and receive in a week?

I send _____ messages, mainly to _____

I receive _____ messages mainly from _____

4. What do you typically do with your mobile phone?

Playing games ☐

Make phone calls strictly ☐

Exchange text message ☐

Surfing / Browsing ☐

Email ☐

Other e.g. _____

5. Would you say SMS is an effect tool to increase access to knowledge and treatment of HIV and AIDS?

True ☐

False ☐

6. If you answered True to no. 5 please explain why you think is an effect tool to increase access to knowledge and treatment of HIV and AIDS

7. Have you ever received any HIV and AIDS related sms / quiz courtesy of Text to Change?

Not at all	Seldom	Often	Frequently	Very Frequently
	1 to 3 times in	3-6 times in	Twice a month	Every week
	past 6 months	past 6 months		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Your attitudes toward text messaging(sms) as a tool of disseminating HIV AND AIDS information

Circle your level of agreement with the following statements:

Completely disagree

Completely agree

I have known how to send and receive text messages (SMS)	1	2	3	4	5
SMS is fast, interactive and interpersonal	1	2	3	4	5
It is annoying to received text messages from someone i don't know	1	2	3	4	5
SMS exchange is not interactive, offers no feedback and is unreliable	1	2	3	4	5
It is fun to send and receive text messages about HIV AND AIDS	1	2	3	4	5
Text messaging is more acceptable than other forms of disseminating HIV and AIDS information	1	2	3	4	5
Text messaging is more acceptable than other forms of disseminating HIV and AIDS information	1	2	3	4	5
Getting information about HIV and AIDS via (sms) is more interesting than other traditional media, e.g. TV, radio, newspaper	1	2	3	4	5
I am satisfied with the information i get about HIV and AIDS via SMS	1	2	3	4	5
I ignore all HIV and AIDS related sms sent to my phone	1	2	3	4	5

Thank you for your time

Annex 4: Guide for interviews with technical respondents and peer educators

1. The recent explosion of mobile technology presents a great opportunity to scale up the AIDS response to poor countries like Uganda. Do you think Uganda is ready to adapt to the use of mobile technology for health care and other imitative other than basic communication?
2. What is your comment on the level of literacy or technological competence in Uganda in relation to the adoption of the use of sms for HIV and AIDS care and treatment?
3. Would you then say SMS is an effect tool to increase access to knowledge and treatment of HIV and AIDS in a resource limited context like Uganda? If yes, in what ways?
4. Are you aware of any scientific evidence or explanations defending the use of mobile communication (sms) in health care initiatives?
5. Besides just sms quizzes, what other text messaging techniques are being used to deliver HIV and AIDS information? Why are you using these techniques?
6. Is there any success stories recorded after implantation of a sms campaign? What are the milestones? What challenges?
7. Is it possible to solely rely on SMS as a tool of dissemination HIV and AIDS information to target audiences without the need for a mix with other traditional medial media like Television, Radio, Newspapers and other tools like flyers, posters, etc?
8. What is the main limitation of using text messaging as a sole channel of disseminating HIV and AIDS information?
9. What is your experience in using or implementing an SMS campaign?
10. Are there any other insights and or comments regarding the potential of sms for HIV and AIDS education?

Annex 5: Map of Uganda showing Mbarara District



Mbarara District

Source: GoU Directory/Mbarara District²⁴.

Key facts:

Area: 1,846.4 km² (712.9 sq mi)

Elevation: 1,800 m (5,906 ft)

Population (2010 Estimate)

Total- 457,800

Density- 247.9/km² (642.1/sq mi)

²⁴ More information is available on the official website for Mbarara District <http://www.mbarara.go.ug/> (visited March , 2011)